



**Doctorado Interuniversitario
Finanzas de Empresa**

**Do different types of company related news have
an impact over stock return, prices and volume?
A short term analysis during the Internet bubble**

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**Research study presented as part of the pre-requisites to obtain the Doctorate degree in
Finance from the joint doctoral program "Finanzas de Empresa"**

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joint doctoral program “Finanzas de Empresa”
Universidad Complutense de Madrid/ Universidad Autónoma de Madrid

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Dedication

To my family, specially to my wife Veronica Rivera, who has always been there supporting me through the ups and downs of this whole process, and my newborn son Jordi Josep. Vero, without your support this wouldn't have been possible. This is for you.

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Síntesis

Este estudio consiste en un análisis del impacto que diferentes tipos de noticias corporativas tienen sobre el rendimiento y el volumen de las acciones de capital a corto plazo, y como estas noticias afectan la percepción y decisiones del inversionista. Las noticias corporativas fueron divididas en cuatro categorías: noticias financieras, noticias de marketing, noticias sobre los recursos humanos de la empresa y noticias de desarrollo e inversión. Un total de 302,440 observaciones fueron analizadas durante un periodo que comprendió entre el 2 de enero de 1998 al 30 de diciembre de 2000 (precios diarios de las acciones de capital, volumen de tráfico diario, rendimientos diarios del mercado de capital y cambios en dichas variables). Se recopilaron y analizaron 3,665 noticias corporativas para las compañías seleccionadas. Se utilizaron las bases de datos CRSP (Center for Research and Securities Prices) y Compustat para recopilar los datos del mercado de capital, información de los estados financieros de las corporaciones estudiadas y los precios y volumen de tráfico diarios de las corporaciones estudiadas. La base de datos EBSCO Business Complete fue utilizada para recopilar las noticias corporativas. En esta investigación se utilizó la metodología de Estudio de Eventos (Event Study) para medir el impacto que las noticias recopiladas pudieron tener sobre el rendimiento de las acciones de capital estudiadas. Del estudio se desprende, que dadas las restricciones impuestas, las dos categorías de noticias que más impacto tuvieron sobre el rendimiento de las acciones de capital fueron las Noticias de Marketing y las

Noticias Financieras, tal y como se planteó en la hipótesis. En promedio estas dos categorías de noticias causaron un rendimiento anormal acumulado (CAR) de -0.0588 y -0.0156 respectivamente, al momento de emitirse la noticia. Los rendimientos anormales (AR) promedio para las Noticias Financieras fueron de -0.0214 al momento de emitirse la noticia y para las Noticias de Marketing este rendimiento anormal fue de -0.0404. Las pruebas de la hipótesis nula H_0 para ambos eventos dio un resultado diferente de cero, -2.01 para la categoría de Noticias de Marketing y -2.41 para la categoría de Noticias Financieras.

En el estudio se repasa y se discute la literatura relevante y se brinda un trasfondo teórico acerca de la Hipótesis de Mercados Eficientes, factores que afectan los precios de las acciones de capital, la psicología y prejuicios de los inversionistas, Teoría de Señales (Signaling), “Noise Trading” y los supuestos principales de la Finanzas Conductual (Behavioral Finance). De esta manera se busca poder brindar un mejor entendimiento al lector sobre la relación que hay entre la información que recibe el inversionista y como esto puede afectar su percepción y proceso decisional al momento de tomar una decisión de inversión.

Abstract

This study consists of an analysis on the impact specific company related news have on the short term company stock return and volume, and how these news affect investors' perceptions and behavior which should in turn, affects stock prices of the firm. Company news were divided into four categories: Financial News, Marketing News, Human Resources News and Investment and Development News. A total of 302,440 observations (daily stock prices, daily trading volume, daily market returns and changes in prices and volumes) were analyzed from January 2, 1998 to December 30, 2000. A total of 3,665 corporate news were analyzed for the selected companies. The CRSP and Compustat databases were utilized to collect the market and company's fundamental information. The EBSCO Business Complete news database was used to collect the corporate news. The news collected were divided into four different categories and the event study's methodology was used to measure their respective impact. The study uncovered that given the restrictions imposed, on average the two more important groups of specific company news, Financial and Marketing News, accounted for -.0156 and -.05 of the average cumulative abnormal return observed during the event date. The average abnormal return for these two categories was -0.0214 and -0.04049 respectively. On the test for the null hypothesis (H_0) on both cases the result was different than zero, -2.016 for the marketing news category and -2.413 for the financial news category.

At first the study gives a brief theoretical background about the Efficient Market Hypothesis, Stock Prices, Investor Psychology and Biases, and Behavioral Finance, in order to understand better the relationship between the information supplied to investors and their behavior and perception.

CHAPTER I

Introduction

There are many factors that influence the price of a company's stock in the financial markets, for example, the company's dividend policy, company risk, expected returns, change in future interest rates, inflation, and many other macro and micro economical factors. But it is interesting to notice how the majority of these factors take a longer time to influence the price of a stock, than the time it would take company news, or "rumors" to influence it (Koretz, 1998). Different studies have mentioned a link between the release on new information or news about a company and changes in that company's share price. Others have mentioned a prolonged effect of new information over stock prices, but no study read during the literature review for this study, has tried to measure what types of news affects stock prices, returns, trading volume and investors' behavior the most. All the papers read on this issue are described and analyzed in the Justification and Literature Review part of this study further ahead. For these reasons and for the apparent impact that different types of news have over the short term stock prices of company stocks, it is indispensable to analyze this phenomenon. I will give a brief background on the Efficient Markets Hypothesis, and Behavioral Finance, and Investors' Biases in order to better understand this study's main problem, which will be stated later on.

Study Objectives

The objective of this study is to determine what is the impact that information specifically news about a company, has on the stock price, return and volume. This issue has been investigated in part by different academic papers, but none of the research reviewed tried to measure the impact of specific news categories, to see which type of news have a greater impact over a company's stock price, returns, trading volume as well as changes in investors' behavior. It is expected that investors will give more or less importance to different types of news, depending on how the news affects their expected return. It would also be helpful to observe in the future which kind of news have a stronger and more prolonged impact over a company's stock price and return. The study also comments on how it is viable that the average investor places more importance on recent news about the company stock, than it would give to fundamental or quantitative analysis. In this study ten stocks were chosen, all of high technology companies (tech-stocks), and the impact that news had over their respective stock prices and trading volumes was measured during the period of January 2 1998 to December 30 2000, right in the boom of the Internet bubble. As stated before, the study tried to observe what type of news (Financial, R & D, Human Resources and Marketing) had a stronger impact on the company's stock price and return, as well as investors' trading behavior. In the last part of the study the impact of such news over the price-return of the stocks is quantified.

Justification

It is considered important to study the relation between the news and the price in the market of the short term capital stocks for the reasons before mentioned. Several examples support this work and seem to indicate that indeed a relation between company news and changes in the prices and returns of the capital stocks exists. A study by Arthur D. Little Inc. in March of 1987 demonstrated that only 30% of the Money Managers interviewed used quantitative methods intensively to analyze if they would or wouldn't buy a company's stock; On the other hand, 70% of the money managers interviewed said to take more into account company news, the analysis of historical movements in the price of the capital stocks, or "technical analysis" (Fabozzi, 1999). Also under certain circumstances according to Scharfstein and Stein (1990): "...managers simply mimic the investments decisions of other managers ignoring substantive private information. Although this behavior is irrational from a social standpoint, it can be rational from the perspective of managers who are concerned about their reputations in the labor market", causing the phenomenon called *herd behavior*. More recently, during the 90's Internet bubble, it was evident how daily news on companies like Yahoo!, Amazon, America Online and other Internet related companies, affected their stock prices and the decision on the part of the investor on whether he/she should buy or sell the stock. It was clear that the value of these companies stocks was not based on fundamental analysis, but rather on investors expectations and how those expectations got swayed either way,

positive or negative, by the daily news these investors were receiving about these “tech stocks”.

There are many examples of “rumors” or financial news that affected company stock prices during this period. One of these examples was during the month of November 1999, when a “rumor” surfaced on different financial news sources about the possibility of a America Online and Netscape merger. During this period the price of the stock of both companies rose even though the news was only that, a rumor, and the merger never materialized. The price of the stock of both companies fell when it was announced that the merger was not going to happen. It is clear that investors’ expectations were affected by the news provided and that they reacted by initially buying both stocks and later selling such company stocks. This “irrational” behavior on the part of the investors made stock prices as a whole, specially those of High-Tech companies (Tech Stocks), highly unstable and increased the prices of many company stocks to monumental proportions between 1998 and 2000.

It should be noticed that during speculative bubbles such as the Internet bubble, prices as a whole rise, creating many success stories among investors. These stories bring more and more investors to try their “luck” in the market, as they imagine the same can happen to them. But in the long run the price of these company stocks could not keep on going higher and higher without been supported by the fundamentals of the firm, earnings and good business models, as stated by Dylan Tweeny in January 1999 on what proved to be a profetic

article (Tweeny, 1999). Investors seemed to realize that there was very little to support such prices and this realization on the part of investors seemed to trigger a crash in share prices by the end of 2000 as investors lost confidence and started selling their stock holdings.

A good example was Yahoo! during this period. In January 29, 1998 Yahoo! stock price was \$58, by January 12, 1999 Yahoo! stock price hit a high of \$438.63. This price movement was not supported at all by the fundamentals of the firm, but rather, it was induced by the different information, rumors and news about future company endeavours, and mergers that never happened. All this influenced investors' expectations, sometimes positively others negatively, about the company and its future. By December 2000, Yahoo! stock price was down to \$25. During its peak Yahoo's stock had a price earnings ratio of over 400, which speaks volumes of its overvaluation at the time.

Another interesting and very documented example of how investors' expectations can be affected by news, and how this affects the stock price of a company, can be observed when analysts announce the degrading or upgrading of their recommendations on a company stock. This event affects the stock price of a company even though the recommendation doesn't provide previously unavailable facts about the situation of the company being analyzed. (Barber, Leahavy, Nichols, & Trueman, 2001) (Womack, 1996) (Desai & Jain, 1995) (Liu,

Smith, & Azmat, 1995) (Bjerring, Lakonishok, & Vermaelen, 1983) (Davies & Canes, 1978).

Yet another example of how news affects investor behavior and company stock price occurs when it is announced that a company's stock is to be included or removed from an important market index, for example the S&P 500¹. It is documented that on the day of the announcement, the company stock to be included or removed from the index, suffers from abnormal volatility in price and volume (Dhillon & Johnson, 1991) (Beneish & Whaley, 1996) (Boyer, 1999). But the effect of the announcement is not only seen on the announcement date, but also in increases (when included to the index) in earning per share (EPS) forecasts and improvements in realized earnings (Denis, McConnell, Ovtchinnikov, & Yu ,2003). Many researchers explain that this increase in price is mainly due to index fund managers rebalancing their portfolio, therefore increasing the demand for the new stock to be added, resulting in an increase in price of the stock, that has nothing to do with the fundamentals of the company.

It should also be taken into consideration the market opinions of experts on Wall Street. Even more, the so called "investment superstars" seem to also have an impact over investors' expectations (Desai & Jain, 1995). We should take into account that the economic environment is really complex, and investors may be uncertain about where to invest and the consequences of their decision to invest in a particular stock. In these situations of high complexity and uncertainty

¹ Standard and Poor's 500 Market Index

investors and decision makers in general, look for the advice and guidance of experts in the field (Morgan & Stocken, 2003). On a curious anecdote, according to Anthony Bianco from Business Week, May of 1998, the Dow Jones Industrial Index (Dow Jones) had gained 65 points during the day and everything indicated another record close for the index. During that time a rumor leaked that Abby Joseph Cohen, Chief Strategist in Goldman Sachs² during that time, had altered her market forecast from a bullish one (positive) to a bearish one (negative). When Cohen was reached for comments the Dow Jones had already dropped 60 points. Cohen rectified the information and stated that she had not altered her market outlook. By the closing bell the index had recuperated, and closed 35 points over the previous day's closing average. The anecdote shows that even rumors of a so called expert, can have an impact on the market, and stock prices. Another more intricate case happened on March 1984. One of the most widely read features on the Wall Street Journal (WSJ) during that time was the "Heard on the Street" (HOTS) column, which was published daily. According to the WSJ, the HOTS column was designed to "inform readers of market developments affecting the price of individual stocks or group of stocks. The emphasis is on timeliness and on stocks with high interests for investors..." also according to the WSJ, the column "is meant to assure the widest possible dissemination of information important to investors". On March 29, 1984 it was announced that R. Foster Winans, one of the authors of the HOTS column, had leaked in advance, information about the timing and the content in the forthcoming HOTS column to four stock brokers. He then shared the illegal gains

² It should be noted that Goldman Sachs is one of the largest investment banks on Wall Street

obtained by acting on this information with the brokers. The Security Exchange Commission (SEC)³ filed criminal charges against them. They all were eventually convicted of fraud and conspiracy for taking part in a scheme of illegally profiting from market sensitive information. The fact that Foster Winans and the four brokers made illegal profits based on advanced information to be published in the column suggests that the information published on the column, and the column itself, has an impact on stock prices (Liu, Smith & Azmat, 1995).

The source of the news, or better said where the news is released or published, also may have an impact over investors behavior and the price of the company stock. Huberman and Regev (2001) offer an interesting example in the Journal of Finance. They examined the case of EntreMed (ENMD), a biotechnology company. On their paper the authors reported how on May 3, 1998, in the New York Times, an article was released about a breakthrough in cancer research done by ENMD, the company which had the licensing rights to the breakthrough. They stated that the impact the release of the news, had on ENMD's stock price was "immediate, huge and to a large extent permanent.". The only problem with this was that the story had no new-news content because the substance of the story had already been published as a scientific piece in Nature, a scientific journal, more than five months earlier. Investments experts specialized on biotechnology companies follow the journal Nature, but not necessarily the regular public or the regular investors. When the news was released in Nature

³ The SEC is the federal government agency in the United States that is in charge of regulating the financial securities market.

the price of the stock had a small reaction, a just price reaction, as experts perceived the new price should be . But when the news was “re-released” in the New York Times, a periodical publication with a much broader and not specialized audience than Nature the price of the stock jumped from \$12.063 to \$85 in just a matter of one trading day. The volume also rose by more than 1000 times from the average daily volume of the stock, the day the news was re-released in the Times, from 10,000 shares to 10,000,000 shares traded that day. The authors asserts that the enthusiasm shown by the general public induced a permanent rise in the share prices of the company, eventhough no new information had been presented. Even when the experiments could not be replicated by other laboratories, the price of the company's shares still was more than twice the value (\$24.875) they had before the released of the article by the New York Times.

An interesting fact that should be taken into account is that the average investor (non institutional) bases his/her investment decision on the most readily available information, which most of the time they receive from news sources such as television, Internet, investment sites, etc., not necessarily on the analysis of fundamental data (Prechter, 2001) (Tversky & Kahneman 1974, 1992). These investors are driven to follow the information received from these sources, because they don't have the adequate knowledge to analyze fundamental data, company prices, financial statements etc.. According to (Glaeser, 2004): “...the body of psychological evidence has documented that decisions are driven by

situational factors, such as framing, social influence, and default rules which are often ephemeral and unrelated to long-run well-being". Not only this, but according to Shleifer and Summers (1990) uninformed investors may simply follow trends that they believe exists in stock prices, this trend chasing only adds to the volatility of the markets since these investors are unaware of the fundamental prices of the stocks they are buying, and can not stop trading since they don't know if the stock is over or undervalued. As stated before, during a bull market there is an upward trend in the market, meaning that there are many success stories, rising stock prices, etc., and the information the media provides is also biased towards the positive side, inciting investors to keep a positive, bullish attitude and keep on buying stocks in the market, just based on the trend and the positive news. It's like the saying during the Internet bubble that many media sources echoed "You just can not lose in this market". The uncertainty that generally exists in the market, specially during periods of speculative bubbles, such as the Internet bubble, can lead to different investors' biases, herding, and many other market-investor behavior phenomena that only add to the volatility of the stock market, more inflated prices and an ever increasing bubble. These different biases and market phenomena will be explain ahead in the literature review chapter.

Some other documented examples of the impact of news are the earnings announcements and leverage changes in a company (Titman, 2002), and stock returns following profit warnings (Bulkley & Herrerias, 2002). To some extend

another example is observed in Westphal and Zajac (1998), where the authors state that conventional agency perspectives assume that stock market reactions to changes in CEO compensation mix reflect economic benefits from reduced agency costs⁴. The authors argue that market reactions may instead reflect benefits (or losses) resulting from symbolic actions that reduce uncertainty about CEO motives. So the perception investors have about news releases concerning CEO's motives, may affect the performance of a company's stock price.

The relevance of this study is not only that it will try to measure the impact news have over stock prices, which as it can be seen this has been documented with different types of announcements, but that it will try to measure which types of news affects investors' trading behavior the most, and therefore which type of news affect stock prices and returns the most. This can give a more complete and rounder idea to future investors, investment professional, and researchers as to what type of news affect more stock prices and how this can affect their respective stock returns. It is also relevant for the area of corporate finance,

⁴ The dominant rationale behind the creation of links between management compensation and firm economic performance was established by *Agency Theory* (Jensen and Meckling, 1976⁴; Fama, 1980⁴). According to agency theory, the separation between owners and managers (Berle & Means, 1932⁴) provided an opportunity for managers to act in their own self interest. The central issue for agency theory is how to resolve conflict between owners and managers over the control of corporate resources (Jensen 1989⁴). The theory argues that under conditions of incomplete information and uncertainty, which characterizes most business settings, two agency problems arise: adverse selection and moral hazard. These problems mean that fixed wage contracts are not always the optimal way to organize relationships between principals and agents. It is suggested that the use of contracts, which seek to allocate decision rights and incentives (Rumelt, Schendel & Teece, 1994⁴), will better align the interests of owners and managers. The primary device suggested by agency theory to achieve this alignment was CEO compensation (salary, bonus and stock options). By linking CEO compensation to the economic performance of the firm, it was hoped that managers would focus more effort toward maximizing the wealth of all stockholders. But this action results in higher *Agency Costs*, in order to solve the *Agency Problem*.

since the price of stocks, will affect different decisions made by the management of a firm. A manager that is interested in maximizing the value of its firm, and the wealth of its shareholders, in other words, the stock price, should take proactive or reactive measure in the face of “irrational” investors. For example when the stock price of the firm is too high a rational manager should issue more shares, to take advantage of the investors’ bullish attitude. The opposite should be done if the market price of its share is too low (repurchase shares). In other words, the managers might use market timing. Therefore this can affect the capital structure of the firm. When investors become too pessimistic, it can cause managers to forgo possible lucrative projects, since it will be more costly to raise funds, since they will need to offer a much higher return to the investors in order to lure them to buy their securities (for example bonds). In the case that investors become too optimistic about the future prospect of a firm, managers face the danger that if they do not undertake specific projects that investors may consider profitable and that may enhance their investment, they (managers) may depress stock prices, risking his job, or lowering the stock price so much as to risk a takeover. Shleifer and Vishny (2003) assert that when a manager faces this situation, that he/she feels forced to undertake some kind of project or investment, the best decision the manager could take may be the acquisition of a less overvalued firm, or one that may retain its value in the long run. This argument by Shleifer and Vishny, means that these actions taken by managers may lead to waves of takeovers, and foresees an increase in stock finance acquisitions when there exists high dispersions in valuation, meaning when the acquiring firms stock is excessively

overvalued. Another interesting argument is stated by Shefrin and Statman (1984), the authors argue that by paying dividends managers help investors avoid regret. They define regret as a frustration that people feel when they imagine having taken an action that would have led to a more desirable outcome. What *Regret Theory* basically examines are individual's emotional reactions to having made an error of judgment. For example, buying a "loser" stock, one that its price has gone down, or not buying a "winning" stock, or one that has experience a positive price change. Therefore, investors might avoid selling "loser" stocks, in order to avoid experiencing the regret of having made a bad investment. This can also lead to herding, when investors try to find comfort in numbers. If they follow the crowd and the stock they bought goes down, then their decision might be rationalized as "everybody else owned it", making the decision less regretful.

But managers might also be "irrational" when they think that they are maximizing the firms' value, even if they are not. For example, managers may be overconfident, on the analysis they make when taking over another firm, this may lead to the manager reacting to quick on his decision to take over the other firm. This overconfidence on the part of the manager may lead to excessive takeover activity (Roll 1986). Managers may also be overconfident about the future performance of their firm, this may lead to different pecking order rules for their respective capital structures. Because managers are optimistic, they might believe that their company's stock is undervalued (in the markets), and therefore

will be reluctant to issue more stocks, unless they have exhausted all other financing options, such as retained earnings or the debt market (Heaton 2002).

Limitations

Some of the limitations to the research are stated on this part of the study. First is the fact that the study only takes into account the United States Stock Market, in later studies it would be good to see how different markets around the world reacted to news presented during the time of the Internet bubble. Another limitation is that the study was conducted during the time of the Internet bubble, which was a time full of noise on stock prices and returns, amplified by the exuberant trading behavior presented by investors in the market. Another limitation is the news collection process, as many rumors, and “news” presented on television or Internet sites, are not documented, and this might affect the predictability power of the model used.

CHAPTER II

Literature Review

The literature reviewed to fulfill the objectives of this study is discussed in this chapter. In addition to the information mentioned previous chapter, different other studies have closely related the stock price to different kinds of announcements and news. A brief theoretical background will be developed as part of the literature review as well as the discussion of recent academic papers and findings. The theoretical framework is as follows.

The Efficient Market Hypothesis

Over the past several decades, the field of finance has developed a successful paradigm based on the notions that investors and managers were generally rational and that the prices of securities were generally “efficient.” In other words, the traditional financial paradigm tries to understand the financial markets utilizing models where the agents participating in such markets, are rational. By rationality it is meant that first, when agents receive new information about a security or the market in general, they update their beliefs correctly, as described by Bayes’ Law⁵. And second, given their respective beliefs, agents should make choices that are normatively acceptable, consistent with their Subjective Expected Utility. According to Barberis and Thaler (2003) “...most models of

⁵ Bayes Law relates the conditional and marginal probability distributions of random variables or events. The probability of the next event is deduced when a new event occurs, and the new data on the event is conditioned to the past probability, it takes into account the last probability and adjusts it.

asset pricing use the Rational Expectations Equilibrium framework, which assumes not only individual rationality but also *consistent beliefs*. Consistent beliefs means that agents' beliefs are correct: the subjective distribution they use to forecast future realizations of unknown variables is indeed the distribution that those realizations are drawn from. This requires not only that agents process new information correctly, but that they have enough information about the structure of the economy to be able to figure out the correct distribution for the variables of interest." .As discussed before, in the justification, this hardly seems to be the case. The theoretical framework on which the "efficient market" concept is based upon is called the *Efficient Markets Hypothesis*. As Eugene Fama defined it in 1965, in his paper "Random Walks in Stock Market Prices" an efficient market is:

"a market where there are large numbers of rational profit maximizers actively competing, with each trying to predict future market values of individual securities, and where important current information is almost freely available to all participants" (Fama,1965).

Furthermore:

"In an efficient market, competition among the many intelligent participants leads to a situation where, at any point in time, actual prices of individual securities already reflect the effects of information based both on events that have occurred

and on events, which, as of now, the market expects to take place in the future. In other words at any point in time the actual price of a security will be a good estimate of its intrinsic value”

In other words, the hypothesis is based on the notion that investors behave in a rational, predictable and unbiased manner. Also, the theory assumes that investor's decision and the price of all stocks (and assets) in the market, reflect all publicly available information, and that stock prices should follow a random walk, that is, that price changes should be random and unpredictable, and therefore do not follow any pattern or trend. According to Eugene Fama:

“In an efficient market, on the average, competition will cause the full effects of new information on intrinsic values to be reflected instantaneously in actual prices.”

In this framework, a security's price equals its “fundamental value”, that is the present⁶ or discounted value of expected future cash flows, where the discount rate is consistent with a normatively acceptable preference specification.

⁶Simple formula for Present Value is as follows: $PV = CF/(1+i)^t$. Where CF is the expected future cash flow and i is the discount rate. The efficient market model asserts that the price of a security (P_t) is equal to the mathematical expectation available at the time of the present value (P_t^*), in general the model would look like $P_t = E_t P_t^*$, where E_t is the mathematical expectation conditional on public information at time t . This implies that any surprise movements in stock prices must have at their origin some new information about the fundamental value (P_t^*) (Shiller 2003). An interesting finding by Barberis & Huang (2001) shows that when there is good cash flow news, the news is accompanied by a lower discount rate, pushing the price up even more. Another common model that links stock prices, information and the discount rate is as follows:

Three forms of the Efficient Market Hypothesis have been proposed.

1. The Weak Form
2. The Semi Strong Form
3. The Strong Form

The *weak form* asserts that current stock prices reflect historical price and volume data. This version of the hypothesis implies that trend analysis is fruitless, since past stock price data is publicly available and virtually costless to obtain.

The *semi strong form* asserts that stock prices include not only historical data, but also all publicly known available information about the company. Such information includes fundamental data on the firm's product line, quality of management, balance sheet composition, patents held, earnings forecasts, and accounting practices. This implies that fundamental analysis is of no use in trying to beat the market.

Finally, the *strong form* of the hypothesis states that stock prices fully reflect all information relevant to the firm, both public and private, also including information available only to company insiders. This is the most extreme version of the efficient markets hypothesis, and the fact that insider information is supposed to be reflected in the price of a security should be questioned since there are laws

$$P_t = E \left[\sum_{i=1}^{\infty} \frac{D_{t+i}}{1+r_{t+i}} \middle| \Omega_t \right]$$

where P_t is the stock price at time t , $E[\cdot | \Omega_t]$ refers to the mathematical expectation conditional to the information at time t D_{t+1} is the dividend to be paid at time $t+1$ and r_{t+1} is the discount factor for dividends that occur at $t+1$.

to protect against insider trading, or people profiting from privileged information before public release.

In other words financial markets are saturated with a large number of intelligent, well educated and well informed investors, seeking under and overvalued securities to buy or sell. The more and more agents participate in this exercise the faster the dissemination of information and the more efficient the market should be. Furthermore, in an efficient market there exists what are known as arbitrageurs or “smart money” that will look for the mispricing or arbitrage opportunities, created by naive investors, and try to benefit from this. This action, on the part of the arbitrageurs, brings the prices back to their fundamental values, bringing equilibrium to the financial markets stock prices. But there is a small problem with this rationale about the arbitrageurs, since there exists different constraints in the markets that might prevent the smart money from exploiting arbitrage opportunities, for example short sale constraints. A short sale is when an investor borrows the stock from its current owner of that stock. The owner of the stock (lender) may charge a fee for the short seller (borrower). The fee to be charged is simply determined by the supply and demand forces for that particular stock in the stock *loan* market. In addition to the cost of borrowing there are other costs and risks associated with short selling, as there might also be laws that impose constraints to selling short. Fear of losing out on their short sale positions because of, for example continued upward trend in an overvalued stock, may prevent arbitrageurs to sell short. Another problem would arise when

there is excessive optimism in the markets. If there is excessive optimism on the part of naive investors, the demand for stocks will rise, leading to a limited amount of stocks that can be shorted. As there is a limited amount of stocks that can be shorted (since the rest are on the hands of naive investors), the price of shorting will go up, probably exceeding the benefits that the arbitrageurs can derive from the short sale. Yet another problem, is the fact that arbitrageurs might derive a better return by just following the over optimism by the naive investors, since this behavior adds to the market movement of prices, and the arbitrageurs might not short sell at all.(Shleifer & Summers 1990).

According to Ullman (1985) economic performance of the firm can be measured by accounting variables, stock price movements, or monthly returns, depending on the research objective. This will focus on stock price, returns and changes in volume and how the different types of news released by the media affect the perception of the investors, and therefore ultimately, how this change in behavior by the investors, will affect their investing strategies, and their decision to buy or sell, affecting in this way the stock price of the firm.

Stock Prices, Investor Behavior and Herd Behavior

Stock prices are determined by a number of factors. A company's operating performance is extremely important, but is just one of many factors, and most of these other factors are beyond management's control. The biggest external factor is overall market trend, as reflected in changes to the market's discount

rate, or cost of capital. When the cost of capital falls the market advances, and vice-versa. Other important external factor is changing market expectations. It is in this factor (market expectations) that investor behavior has the strongest impact on the stock price. For example, many uninformed traders will simply follow any trends they believe exist in the financial markets, this behavior increases the volatility observed in the market, as these investors are unaware of the real fundamental values of the securities being traded, and therefore are unable to stop trading once the security is overvalued (Shleifer & Summers 1990). This type of behavior causes price movements in the stock market, which are not related to the fundamental values of the firms. These trend chasers are basically uninformed investors, and their behavior can cause a speculative bubble (Caginalp, Porter & Smith 2000). This behavior, when individuals take actions, uninformed and mimicking the actions of others is called *herd effect*. According to Robert Pretcher (2001): "Human herding behavior results from impulsive mental activity in individuals responding to signals from the behavior of others". The author states that given the biological process that occurs during this practice these impulses to herd are typically faster than rational reflection. According to Pretcher: "The reasons forecasters, inaccuracy worsens with herding is that the net valuation of the stock market is the result of herding. To forecast on the basis of the current sentiments of the herd is to forecast the present mood, not future events. Success is simply a matter of whether the present mood maintains, which it usually does not." An interesting fact is that when individuals engage in herd behavior, they tend to disregard the information

received and keep on replicating the herd movement. This herding pattern usually occurs when individuals believe that the herd has better information than the information the individuals have, and when the herding behavior starts to occur, the decision taken by the herd, overwhelm the signals that any particular individual receives (Owen 2002)⁷. Lee, Shleifer and Thaler (1991) state that many investors decide to trade only a subset of all available securities. As the investors' risk aversion or expectations changes, they alter the exposure to the particular securities they hold. This view of co-movement indicates that there will be a common factor in the returns of securities that are the primary holding of a subset of investors, for example tech stocks during the Internet bubble. Another interesting point is the fact that not only "naive" investors fall in to herding behavior, but it also happens to the professional investor such as mutual funds managers. On a study done by Hong, Kubik and Stein (2005) it is shown that mutual fund managers are more likely to buy or sell a particular security if other managers in the same city are buying or selling the security. The authors argue that this usually happens when the security being traded and the fund manager in question are located far apart. The authors explain that the evidence can be interpreted in terms of a model in which investors share information and spread this information by word of mouth. This word of mouth effect also affects

⁷ An interesting model is developed by Owen (2002) to explain the decision to buy by an individual

affected by herd behavior, the model states that $D_{jt} = E(R_{t+k} | \Omega_{jt}) + \sum_{i=0}^{n-1} \Delta_i$ Where the decision D_{jt} is based on the expectations of the j th investor has for future returns on the stock, $E(R_{t+k})$, given the signal the individual receives Ω_{jt} plus the previous actions of other investors $\sum_{i=0}^{n-1} \Delta_i$, when many investors are added to the mix, an informational cascade occurs, and they start ignoring the signals they receive and give more weight to the actions taken by others.

investors' behavior when speculative prices rise. This situation creates success for some investors, this attracts public and media attention and promotes a word of mouth enthusiasm, and this enthusiasm increases expectations for future price increases. According to Robert Shiller (2003): "The talks attract attention to "new era" theories and "popular models" that justify the price increases. This process in turn increases investor demand and thus generates another round of price increases. If the feedback is not interrupted, it may produce after many rounds a speculative bubble, in which high expectations for further price increases support very high current prices". This situation of word of mouth feedback models translate exactly to what happened during the Internet bubble, where not only the information was spread from investor to investor, but the media played a crucial part on these "success stories" and positive outlook being spread through the masses. According to the author speculative bubbles appear to be common to certain investing style, for example buying tech stocks during the end of the 90's. In a paper by Barberis and Shleifer (2000) it is discussed how news about one style of investing can affect stock prices from apparently unrelated styles. The authors argue that one of the clearest elements of human thought is classification, and that we tend to classify using different categories. Individual investors tend to do the same and they classify assets and stocks based on their qualities. This classification by styles, cause the securities grouped in a specific category to co-move.

Noise Trading

Another interesting factor that in my opinion can induce to some extent the herding behavior is *noise trading*. According to Black (1986) noise trading is "...trading on noise as if it were information. People who trade on noise are willing to trade even though from an objective point of view they would be better off not trading. Perhaps they think the noise they are trading on is information. Or perhaps they just like to trade". The author also asserts that noise trading must account for a significant part of the total trading in the financial markets. Trueman (1988) argues that investment fund managers may be motivated to engage in noise trading. According to Trueman this is done on the part of the investment managers in order to convey to investors that he/she is well informed. This should lead investors to increase the amount of money that they invest in the fund. The author states that noise trading is more commonly observed in risky assets. This goes in accordance to the fact that when people have little information or there is asymmetry in the information and uncertainty, they tend to base their decisions on the most readily available information, and they may interpret any information they receive as "hard facts" or "real facts" and base their decisions on the "information" received, given the time constraints that investors face when making an investment decision in the fast paced financial markets. As it has been documented the ability to avoid errors of intuitive judgment is impaired by time pressure and constraints. (Finucane, Alhakami, Slovic & Johnson 2000). So basically an investors' decision to buy or not to buy based on the information being given will be influenced by the time he/she has to make the

decision, this will limit the amount of information the investor can analyze, and will tend to follow the most readily available information, even if its noise. The investor might not have time to rationalize if it's a real fact or just noise, since he/she might lose the timing of the investment, or the investment opportunity window. Therefore the processing of information might be superficial. Since most of this information the investors receive through the media is in fact "noise", investors' decisions may be wrongly based and easily swayed by more "noise", adding to the volatility of the markets. This may also affect firm managers, if these managers listen to investors' opinions, because perhaps, they may think that investors know something that they do not know, therefore managers may misinterpret excessive optimism as well founded optimism. This may lead managers to undertake bad investments at wrong times, or negative net present value investments, since they might think that these investments could be profitable given investors optimism (Barberis & Thaler 2003). Many financial news that reach investors during a day of trading, are based on rumors or assumptions and not real facts, making these news basically noise (for example rumors of mergers, etc).

Signaling

As mentioned before, given the asymmetry in information that exists in the market place, where investors may not be fully informed about all the situations affecting their investments, returns etc, individuals may rely excessively on

information signals. Signaling theory is based on the assumption that information is not equally available to all participants in the market at the same time, and that there exist information asymmetry. The creator of signaling theory was Michael Spence (1973) who as part of his doctoral dissertation researched on the signaling in the job markets, this later has been applied to different other areas of studies. Investors rely on signal because the direct evaluation of the decision to be taken, the quality of an investment, the fundamentals of a company, etc, might be too difficult to evaluate. A signal is a piece of information that might create, change or confirm expectations on the part of the investors. The act of signaling is sending signals that influence expectations. The signals can be strong or weak, isolated or repetitive, and also the signal can have different weights⁸ for the receiver of the signal. Given different constraints in investors' making like limited attention, memory and processing capabilities, investors and individuals in general tend to focus on subsets of available information; also unconscious associations create a selective focus. The verbal signals individual receive triggers associations that influence judgments (Higgins 1996) (Gilovich 1981). This selective focus and selective triggering causes what is known as the salience effect, where an information signal is referred as a salient signal if it has characteristics that are good at calling or captivating our attention or at creating easy association that facilitate the recall of information. According to a study done by Tversky and Kahneman (1973), items that are easily recalled are judge to be more common. The fact that during the Internet bubble, most of the

⁸ The strength of an information signal is how "extreme" the evidence is and the weight is the reliability of the signal or its precision (Griffin & Tversky 1992).

companies that were providing high returns in the market were tech stock, investors in general associated tech stocks with high returns, without regards to what kind of business the company conducted, or if the company had a sound financial condition. Examples of signals sent by managers of firms, to convey the financial state of the firm, or the perception management has towards the price of the company stock are stock splits, changes in dividend policies, stock repurchases, changes in management and others. Another example occurs when investment managers trade on their respective portfolios without having any new private information, to convey to investors or potential investors that he/she is well informed. This is done on the part of the investment manager in order to attract more money to the portfolios because investors might get the signal that they are well informed professionals, when in fact they are trading on noise. A very interesting example of the usage of specific signals as a manipulation tool is given by Bhattacharya and Dittmar (2004), where the authors state that "...46% of all firms that announce share repurchase programs do not purchase a single share within the quarter of or the quarter following the announcement. As a matter of fact, 27% of firms that announce, do not repurchase within four fiscal years of the announcement ...Thus if repurchase signals value, then these firms simply use announcement, which is virtually costless, to attract scrutiny from speculators and have their true value discovered, whereas the rest of the firms repurchase their stocks which is costly, to signal their value". Therefore managers and firms use information signals to influence investors' behavior.

As stated before, not all demand changes appear to be supported by fundamentals, and also they might not appear to be rational decisions on the part of the investors. But these changes can be influenced by signals, or pseudo-signals that investors perceived as conveying information about the future of their investments (Black 1986). An example of such signals are recommendations or advice given by investment professionals, brokers or the so called "investment gurus". Depending on the strength of the signal, and the weight the investors give to it, will define if the investors act or not on the signal received (buy or sell), this can be considered noise as well. Although the signal received by the investor may not be supported by the fundamentals of the firm in question, it might be related to such fundamentals, therefore conveying the idea that it is "real news" about the company, and the investors might decide to give more weight to the signal, and act on it. Hirshliefer (2001) stated that people tend to excessively rely on the strength of the information signal and under rely on the weight of such signals.

This signaling is really important to this study, since the investors are constantly bombarded with signals being sent by companies, brokers, media, financial gurus, etc, and the investor must choose to which types of signal he/she will pay more attention. This is related to the classification of news in this study, in order to see which type of news investors respond to the most, or give more weight, depending on the way these investors react to it. Many interesting question can be derived from this in the study of the Internet bubble, for example, was the media constant coverage, and constantly portraying a bullish attitude done in

purpose in order to keep investors' sentiment high, and keep the bullish market going?. Was it all fault of the media or did the companies played a part on this too?. It seems as it would surely benefit those companies to keep their stock prices high, in order for the managers to obtain more funds through the issuing of new stocks. And definitely the investment banks involved in all the new stock issuing, IPO's and all the related services to raising funds, should also have big interest in maintaining the bubble going since they were profiting substantially from that situation. But this is a topic that can be investigated in another study.

Let's take a look at different market "anomalies" in order to better understand the influence investor behavior has over the market prices of stock, independently of how good or bad is the performance of a company.

Since the 1960's many researchers have tested the efficient market hypothesis, and in recent years, some "anomalies" started to appear, that seem to contradict such hypothesis. Some examples of these "anomalies" are:

- 1. The January Effect-** Stocks in general, but particularly small company stocks, have generated abnormally high returns during the month of January, they tend to rise from December to January (Thaler 1987) (Haugen & Jorion 1996). This may be explain by investors selling losers during the month of December, for tax reasons, and then buying them back

2. **Turn of the Month Effect-** Stocks consistently show higher returns on the last day and first four days of the month (Ariel 1987).(Hansel & Ziemba 1996) It is interesting to mention that according to Ariel, the rest of the month displays mainly negative returns.
3. **The Monday Effect-** Monday tends to be the worst day to invest in stocks, and negative movements from Friday to Monday are also observed in the markets (Fields 1931) (Harris 1986) (Smirlock & Starks 1986)
4. **Holiday Effect-** The day before holidays usually shows abnormal positive returns. (Ariel 1990) (Lakonishok & Smidt 1988)
5. **Intra-day Effect-** Generally prices fall during the first 45 minutes on Monday, but rise sharply during the first 45 minutes of all other weekdays, and during the last hour of the trading day, specially the last trade (Harris 1986).
6. **Size Effect-** Small firms tend to outperform, in asset capitalization, the big firms.(Banz 1981)
7. **Mean Reversion**⁹- Over long periods of time Stocks that perform badly in the past tend to perform better in the future and vice-versa.(DeBondt & Thaler 1985)(Fama & French 1992)
8. **The S&P “Game”**¹⁰- When stocks are added to the S&P index, their prices tend to rise by almost 3%, without any new information being released.(Shleifer 1986) (Harris & Gruel 1986)

⁹ Bondt and Thaler (1985) found that stocks that had high returns over three years tended to show negative cumulative returns in the succeeding three years, and stocks that had low returns over the prior three years tended to have positive returns over the following three years.

9. Value Investing Approach¹¹- Historically investors overestimate the prospects of growth companies and underestimate value companies. In other words, investors underpriced out of favor stocks but are overly optimistic about growth companies. (Lakonishok, Shleifer & Vishny 1994)

Many other anomalies are present in the markets, and as Peter Bernstein states in his book *Against the Gods, the Remarkable Story of Risk*: “the evidence reveals repeated patterns of irrationality, inconsistency, and incompetence in the way human beings arrive at decisions and choices when faced with uncertainty”. But it is not that the investors are irrational, but only that the existing models consider this results and irrational behavior as “anomalies” or “errors investors make”. A good question arises then, are these examples really “anomalies”, if they keep repeating themselves over and over in the markets? or, why do investors keep on committing these errors over and over?. As Eugene Fama stated in his 1998 paper “Market Efficiency, Long Term Returns and Behavioral Finance”, these anomalies are chance deviations to be expected under market efficiency. But as Daniel, Hirshleifer and Subrahmanyam (1998) stated, “we believe the evidence does not accord with this view point, because some of the return patterns are strong and regular...and are present both internationally and

¹⁰ The authors attribute this appreciation by the increased demand of the stocks being added, by index fund, mutual funds, and others, that try to replicate the S&P index.

¹¹ Under the value investing approach other anomalies exist, such as outperformance of firms that show low book to market ratios, when compare to high book to market ratio companies, as well as low price earnings ratio to high price earnings ratios.

in different time periods”. So how can we explain why these “anomalies” and such investor behavior happen?

Behavioral Finance and Investor Psychology

This is where Behavioral Finance comes in. It attempts to explain how emotions and cognitive errors influence the investors and the decision making process. It tries to explain why, for example, during the Internet bubble; investors seemed to ignore critical information about the stocks they bought, bidding the prices up, and then pushing them back down. Obviously the Efficient Market Hypothesis does not explain this kind of behavior, even though investors had the information to take sound decisions. Again, it is not that investors are irrational, but that their thinking and decisions are often guided (or misguided) by biases and cognitive illusions. Biases are judgments that can be systematically wrong or systematic errors of judgment. Another important issue to remember is the fact that investors are not identical, so even if they have the same information they might react differently. Behavioral Finance combines the theory of finance from different ideas from fields like psychology and sociology, which often portray more realistic ideas on how people think and react to different aspects of life. This combination of ideas can help to understand better the way investors behave in the financial markets, and when making financial decisions.

Prospect Theory

Theorists argue that any significant decision is basically a choice between gambles, because the outcomes of the options available are not fully known in advance. A gamble is characterized by the range of its possible outcomes and by the probabilities of these outcomes. The majority of models dealing with risky gambles and asset prices assume that individuals evaluate gambles according to their expected utilities. The roots of such thinking goes back to Von Neumann and Morgenstern (1944), the study showed that if an individual's preferences satisfy a number of axioms, these being, completeness, transitivity, continuity, and independence, then it can be represented by the utility function. But different experimental studies have demonstrated that individuals systematically violate the expected utility framework (Barberis & Thaler, 2003). According to Kahneman and Riepe (1998), people make judgments about probabilities; they assign values (also called by economists *utilities*) to outcomes. The combination of beliefs and values is what forms preferences about risky options. Furthermore in Kahneman and Tversky "Prospect Theory" (1979), they state that people respond differently to equivalent situations depending on whether it is represented in the context of a loss or a gain. Typically, they become considerably more distressed at the prospect of losses than they are made happy by equivalent gains. This loss aversion means that people are willing to take more risks to avoid losses than to realize gains. Based on their study, even when investors are faced with sure gain, most investors are risk averse; but when faced with sure loss, they become risk takers. According to the *endowment*

*effect*¹², people set a higher price on something they own than they would be prepared to pay to acquire it. The evidence presented by Kahneman and Tversky suggests that the degree of loss aversion shown by individuals depends on prior gains and losses. For example, a loss that comes after a prior gain is less painful than usual, because it is buffered by the earlier gains. Now, if a loss comes after other losses it is more painful than usual, therefore individuals become more sensitive to additional setbacks. Thaler and Johnson (1990) found that after a gain on a prior gamble, individuals are more risk seeking than usual, while after a loss, these individuals become more risk averse. In addition in a previous study done by these same two psychologists (Tversky & Kahneman, 1974), they stated that people judgments tend to be made using a representativeness heuristic, where they try to predict, by seeking the closest match to past patterns. Kahneman and Tversky (1979), state that intuition plays a crucial role in most of investor's financial decisions, since these decisions are made under situations of high complexity and high uncertainty. Another important part in Prospect Theory is the fact that utilities are defined over gains and losses and not on the final wealth positions. In other words, Prospect Theory will focus in changes of wealth, and expected utility theory focuses on the level of wealth. Another interesting point implied by the authors is the fact that as Kahneman stated "Utility cannot be divorced from emotions, and emotions are triggered by changes". The approach that Prospect Theory takes seems as a more natural way to view gambles. The

¹² The Endowment Effect: The value of a good increases when it becomes a part of a person's endowment. The person demands more to give up an object than they would be willing to pay to acquire it.

authors give a very interesting example in their paper; they ask a group of subjects the following questions.

In addition to whatever you own, you have been given 1000. Now choose between these two gambles

A= You can bet the 1000 with a 50% probability of earning it all and a 50% probability of not winning anything

B= You can earn 500 with a probability of 1

B was the most popular choice between the two gambles.

The second question was stated as follows

In addition to whatever you own, you have been given 2000. Now choose between

C= Losing 1000 with a probability of 50% or not losing anything with a probability of 50%

D= Losing 500 with a probability of 1

Now, with the question formulated differently the most popular answer was C. If we take a closer look at the final wealth position the two problems are identical, but individuals chose differently when the question was formulated in terms of losses or gains. This is known as *framing*. It refers to the way a problem or a

situation is proposed to the decision maker. Framing effects are very powerful and there are various demonstrations of an impact of 30% to 40% in changes in preferences depending on how the problem or situation is conveyed or worded (Barberis & Thaler 2003). This is very important for this study since the wording of the news being released may sway investors' decisions to buy or sell, depending on how the news is portrayed. For example, during the Internet bubble, most news and investment firms' recommendations were of the positive kind. These news and recommendations only helped to reinforce investors' perceptions about the market, swaying them to buy stocks that for the most part were overvalued. In addition individual events provide a temporal anchor upon which expectations are based. This implies that investor perceptions will have a greater impact on an investor's behavior, if it is about the near future, and has a strongly positive or negative affective quality, is well known, and has potentially vivid consequences (Loewenstein et. al. 2001). Anticipation of probable rewards generates positive affect. Positive affect increases investors risk taking behaviors and this will in part affect the trading volume of the session and the return of the related stocks. If the news and signals received are perceived as negative, this will lead to anxiety and negative affect in investors. Negative affects should accelerate risk averse, protective behaviors or selling of stock. If we combined this statements with the signaling theory mentioned before, noise trading, prospect theory and the biases that will be mentioned later, we can get a clearer idea of why different types or categories of news will have a different impact on investors' trading behavior, and to which news these investors will pay more or

less attention, depending on the benefit these investors perceive acting on the signal will provide them.

This phenomenon seems to definitely affect investors' behavior and therefore it could affect company's stock prices and returns, as well as trading volume during a specific date.

Investors' Biases

There are different biases that affect this intuitive judgment and therefore affect the investment decisions. Some of these cognitive biases are (Kahneman & Tversky 1974) (Alpert & Raiffa 1982) (Weinstein 1980) (Buehler, Griffin and Ross 1994) (Rabin 2002) (Lord, Ross and Lepper 1979) (Shefrin 2000) (Brunnermeier & Parker 2003) (Thaler 1980):

- 1. Overconfidence-** Investors habitually assume they know more than they do. They also reinterpret past decisions to exaggerate their own foresight (Odean 1998).
- 2. Availability bias-** The tendency to base decisions on the most readily available information. Also when individuals judge the probability of an event they will search their memories for relevant information (Tversky & Kahneman 1973). Since according to Tversky and Kahneman (1974) not all memories are equally retrievable or available, more recent events will be given more weight and this will distort the individual's estimate.

3. Representativeness Heuristic- Projecting from stereotypes.

Assessing the probability of a state of the world based on the degree to which the evidence presented is perceived as similar to or typical of the state of the world (Tversky & Kahneman 1973) (Tversky & Kahneman 1974) Investors project from stereotypes as seen during the Internet bubble, where the companies that were perceived as tech stocks, were also perceived as potential winners.

4. Sample Size Neglect- When individuals judge the likelihood that a data set was generated by a particular model, they often neglect to take into account the size of the sample. This means that when individuals do not initially know the data-generating process they will tend to infer it too rapidly on the basis of too few data points.

5. Optimism and “Wishful Thinking”- Most people are biased in the direction of optimism; people display unrealistic positive views of their abilities and prospects. It is interesting to note that people display a systematic planning error. They predict that tasks, such as writing a thesis, will be completed a lot sooner than the tasks actually are (Buehler, Griffin and Ross (1994)).

6. Conservatism- According to Barberis & Thaler (2003), it appears that if a data sample is representative of an underlying model, then individuals will tend to overweight the data. However if the data is not representative of any relevant model, then people react to little

to the data and rely too much on their priors, leading to conservatism.

- 7. Aversion to Ambiguity-** This is the preference by individuals, for the familiar over the unfamiliar. This leads to another bias known as the home bias, where investors allocate a bigger part of their assets to domestic companies. Also, individuals are not comfortable in situations where they are uncertain about the probability distribution of a gamble.
- 8. Loss Aversion-** Investors tend to put more weight, or give more importance to avoiding losses.(Kahneman & Tversky 1979)
- 9. Belief Perseverance-** When individuals form an opinion, they tend to hang on to that opinion too strongly and for too long.(Lord, Ross and Lepper (1979)) This occurs since individuals are reluctant to search for any evidence that could contradict their initial beliefs, and if by any chance they find such evidence, they treat it with excessive skepticism, for example, stock overvaluation during the Internet bubble.
- 10. Self Attribution Bias-** Investors ascribe successful outcomes to their skills, but blame failure on their bad luck, rather than to their inability to perform well. This repeated behavior will lead individuals to the pleasing but erroneous conclusion that they are very talented.(as discussed by Barberis & Thaler 2003)

- 11. Biased Self Attribution-** This happens when investors attach too much significance to signals that confirm their prior beliefs and too little significance to information signals that contradicts them. (Fischhoff 1982) (Miller & Ross 1975) (Taylor & Brown 1988)
- 12. Hindsight Bias-** The tendency by the part of individuals, after an event has occurred, that they predicted it before it happened (Hawkins & Hastie 1990)
- 13. Anchoring and Adjustment-** Too conservative extrapolation from current data, and too slow readjustment of expectations based on changes. People fixate too much on initial values. (Tversky & Kahneman 1974)
- 14. Mental Accounting¹³-** The process by which people think about and evaluate their financial transactions. Individuals sometimes separate decisions that in principle should be combined (Thaler 1985)
- 15. The Halo Effect-** When someone, in our case an investor, likes one outstanding characteristic of an individual (a company) and generalizes this favorable evaluation to all other aspects and other characteristics of the company. (Nisbett & Wilson 1977)
- 16. Illusion of truth-** Individuals are more inclined to accept the truth of a statement that is easily processed. Also familiar signal combinations are more readily accepted than unfamiliar signal

¹³ This behavior may lead to what is called the *disposition effect* which is the propensity by individuals to hold on to investments or stocks that have lost value, and sell those who have gained value, in order to realize “paper gains” (Shefrin & Statman 1985).

combinations. (Bruner, Postman & Rodrigues 1951) (Reber & Schwarz 1999)

17. Narrow Framing- Individuals analyze problems in a too isolated fashion. (Read, Loewenstein & Rabin 1999) (Kahneman & Tversky 1993)

18. Status Quo Bias- Occurs when individuals prefer the choice which is designated as default or status quo among the selection of alternatives offered (Samuelson & Zeckhauser 1988).

19. Gambler's Fallacy- This is the belief that in an independent sample the occurrence of one outcome (recent) increases the odds that the next outcome will differ. (Clotfelter & Cook 1993).

20. False Consensus Effect- Individuals mistakenly believe that other individuals share their beliefs more than these other individuals really do (Ross, Green & House 1977).

There are also dependence factors that affect investors, like, concurring decisions, hedonic editing, regret and money illusion. These different biases and dependence factors cause investors, and therefore also the markets, to over and under react when presented with different kinds of information (Daniel, Hirshleifer & Subrahmanyam 1998). Investors put too much weight on recent news at the expense of other data, causing this market over- or under reaction. People tend to become more optimistic when the market goes up and more pessimistic when

the market goes down. Therefore, prices fall too much on bad news, and rise too much on good news.

Suggestion and investors perception has a lot to do with this. According to Loewenstein et. al. (2001), the vividly imagined possibility of imminently achievable wealth and material success in an average investor will lead to a strong drive to invest in an asset. Likewise, the vividly imagined possibility of personal poverty or market panic will generate the desire to divest or sell the asset. Combine this with the feedback models mentioned before, the media releasing bullish news, and the investors supporting overvalued prices, and we can better understand why the Internet bubble happened and the impact the information had over investors' behavior and stock prices. Macgregor, Slovic, Dremen, and Berry (2000) found that subjective affect and imagery influence investors' judgment in predicting assets financial performance. Other studies have documented that environmental factors that alter individuals' moods are correlated with stock price movements (Kamstra, Kramer and Levy 2000)

The biases mentioned before lead to different errors in investors' behavior such as insufficient diversification (home bias, availability bias, aversion to ambiguity), naive diversification (availability bias, representativeness, anchoring, home bias, $1/n$ diversification¹⁴ and others), excessive trading (overconfidence), just to name

¹⁴ This means that when people diversify they usually do it allocating $1/n$ of their savings to each n of available investment option.

a few.¹⁵ The interesting thing is that these biases and the errors of judgment they can cause are not random errors but systematic errors, meaning that investors commit the errors of judgment systematically.

If we take into account the investors biases presented above, especially the availability bias, representativeness heuristics, and imagery, it is logical to think that different types of news should affect investors differently. According to behavioral finance and signaling theory, since there exists an information gap, and taking into account the availability bias of the investors (and the other biases mentioned above), they might invest in a stock depending only on the signal sent. So let's suppose, for example, that a new compensation plan is announced for company X, and the compensation of the CEO of the company X is now changed and is mostly linked to the performance of the firm, due to the lack of information the investors have about the insides of the company, they might believe that the CEO has some insider information not known to them, and that is the reason why the CEO has accepted a new compensation mix, or that the CEO expects future firm performance to be good. Based on this signal sent by the company, and the CEO, investors would buy the stock driving the price up. But this appraisal (in the short run) has nothing to do with the CEO performance or "actions" taken, but only on the perception and expectations of the investors.

According to Marcus and Goodman (1991), "the market price of a good or service is influenced by the signals sent...", the authors state that by applying signaling theory to the stock market, we can see that investors buy and sell stock

¹⁵ It should be pointed out that Barber & Odean (2002) mentioned that the greater access to information and a greater degree of control over investments, offered by online trading services has been shown to increase investors' overconfidence

with incomplete information and can be influenced by presentations of corporate policy. There are important points to this, the first is that “in any market there is an information gap between buyers and sellers, with buyers knowing less about the commodity sold than sellers, and second, sellers emit a signal at some point during a transaction and buyers respond to this signal (Barzel, 1976; Mirrlees 1971; Riley 1975)”. We should also take into account what Ross (1977) states that “the manager should also be assumed to have special inside information about the firm”, this also sends a signal to the market, given changes in the compensation mix, about the expectations of CEO about firms future financial performance. Westphal and Zajac (1998) state that top managers can satisfy external demands for increased accountability to shareholders while avoiding unwanted compensation risk and loss of autonomy by adopting, but not implementing, governance structures that address stockholders interest and by bolstering such actions with social legitimate language. In other words, a CEO can influence the investor’s perception of the future of the company, by just transmitting or adopting governance structures that signal to the investors that their interests are safe. The authors also add a very interesting point, stating that the stock market reactions are viewed in the financial economics literature as providing hard numbers about the value of the firm, while from their stand point, firms can influence market reactions and therefore change the underlying value of the firm through the use of symbolic action. This discussion takes us to a series of propositions:

Proposition 1

It would be expected that investors will give more importance to the category of news which they feel will signal, more tangible gains or losses on their investments. Investors tend to classify their decision frames into transparent and opaque (Tversky & Kahneman 1986), transparent being a clearer set of information and opaque being a “not so clear” set of information for the investor. It is expected that investors will pay more attention to Financial and Marketing news, since the information these news convey seem to have a clearer cause-effect impact over an investor’s return than Human Resources and Research and Development news seem to have, as investors might not clearly understand a direct relation between the latter news and their investment’s return.

Proposition 2

There should be higher trading volumes when news are presented. As the literature suggests, the higher the changes in trading volume, the bigger the impact the news presented had on investor trading behavior.

The discussion presented before shows how the perceptions of the investors can be influenced, and how they can take actions (buy or sell), just based on that perception, and not necessarily because fundamental numbers support stock prices. According to Beatty and Zajac (1987) market reactions should be viewed

more as soft numbers that reflect the perceptions of a heterogeneous audience. Westphal and Zajac (1998) also add that given the fast response and imperfect communication that characterizes market reactions to announced events, investors can be expected to estimate how other investors will act, and this estimations will be influenced by prior market responses to similar events. This goes in accordance with Kahneman and Tversky's (1974) representativeness heuristics.

In my opinion the stock price of the firm is affected by investors' behavior, which is influenced by news about the company. Also different kinds of news should affect investors' behavior differently. This brings us to the main problem of my study:

How do different news (as classified by different categories) affect investors' perception and behavior and therefore the return of the firm's shares? Also which of the news categories proposed have a stronger impact over investors' perceptions and stock returns?

In addition to the information mentioned above, different other studies have closely related the stock price to different kinds of announcements and news. For Example, Pearce and Roley (1985) studied the response of stock prices to announcements about the money supply, inflation, real economic activity, and the discount rate. Jain (1988) analyzed the response of stocks return and volume to economic data such as consumer price index, unemployment rate, and

industrial production. Liu, Smith and Azmat (1995) examined the impact of the information reported by the Wall Street Journal on the stocks recommended. Allen and Gale (1992) studied the impact of uninformed speculators activities over the price of shares, and how this behavior could sway investors' buying-selling activities, if investors perceived the speculator is well informed. McQueen and Roley (1993) investigated the relationship between stock prices, economic news and different stages of the business cycle. Ikenberry et. al. (1995) found that stock prices rise on the announcement of share repurchases. Michael, Thaler, and Womack (1995) found similar evidence, but taking into account news of dividend initiation and omissions. Ederington and Lee (1995) conducted a study on how prices on the foreign exchange future market adjust to new information contained in macroeconomic news, in the short run. Desai and Jain (1995) studied the impact of "Superstar" money managers on the return of shares. Loughran and Ritter (1995) and Spiess and Affleck-Graves (1995) found evidence on price changes after seasoned equity offerings. Ikenberry, Rankine, and Stice (1996) did a similar study but looking at price changes after "stock split" news. Womack (1996) found that analysts' recommendations have also an impact on stock prices. Daniel, Hirshleifer, and Subrahmanyam (1997) and Fama (1998) summarize a large number of event studies showing different reactions to news events. Titman (2002), Ikenberry and Ramnath (2002) discussed the underreaction of self selected news events. Buckley and Herrerias (2002) studied and found a relation between the returns of stocks and (after) profit warnings. Chan (2002) studied what is the reaction of stock prices to news and no news.

Denis, McConnell, Ovtchinnikov and Yu (2003) conducted a study on the relationship between share prices, and the addition of companies' stocks to the S&P 500 index, the authors assert that not only does the addition has an impact over the stock price but also over the earnings per share forecasts and realized earnings. Morgan and Stocken (2003) examined the information content of stock reports when the investors are uncertain about the analyst's incentives. Hong, Kubic and Stein (2005) studied the reaction on the trading behavior of mutual fund managers when other managers in the same city buy or sell a specific stock. Some of these studies look at different kind of events, how they affect investors, as well as what was the impact on the market. Other studies look at the reactions of investors based on bad or good news. Grossman and Stiglitz (1980) observe that market prices cannot perfectly reflect all available information, or else information gatherers would earn no compensation for their costly activities. The authors argued that if all information or at least relevant information is already reflected in the market prices of securities, market agents would have no incentive to acquire the information on which market prices are based. But this is not the case in financial market, where agents gather information and use this information for individual use or on behalf of clients. Taking this into account, practitioners, especially brokerage firms, would benefit from knowing what kind news affects stock prices and therefore, their investors the most, and these firms could anticipate what are the needs of their clients, and how they could customize their strategies in order to make more attractive their advice and business. But not only would financial firms benefit from this, also

individual investor could anticipate what is going to be the approximate reaction of the market, changes in price-return of different stocks, and take advantage of this in order to improve their returns, and make the most of their investing strategies.

CHAPTER III

Methodology

The methodology utilized to fulfill the objectives of this study is discussed in this chapter. In order to fulfill the purpose of this study, relevant information was gathered by reviewing the appropriate literature, identifying information related to the movement and volatility of stock prices, market volatility, factors that influence stock prices, expectations, investor psychology, and event study methods.

As stated before, this study will try to measure two basic things. First, the perception investors have about different types of news and how these news affects their investing behavior. The second variable to be measure is the change in prices and therefore stock returns, that occur when investors start buying or selling based on specific company news. In the study it will also be measured which type of news have more impact on investors behavior and therefore on the return of the company stock. The impact the news has over investor behavior, whether he/she buys or sells their stocks, can be seen through the changes in trading volumes. Many studies have found that increased trading volume was associated to the release of new information (Karpoff, 1986) (Bamber, 1986) (Jarell, 1989).According to Jain (1988): "Announcements about economic variables may also affect trading volume if the market participants rebalance their portfolios based on the new information". On a study by Nikolai Chuvakin (2002)

the author mentions that “It appears that trading volume varies directly with the difference in investors opinions”. The volatility of the stock prices was measured comparing stock movements to those of the market indexes. The information obtained during the literature review was analyzed, as well as the different news obtained through the media. During this phase of the study the relationship between company news, investor perceptions and the selected company stock were analyzed.

Selected Company Stocks and Data

A group of ten company stocks were selected; all companies are from the technology-Internet sector. These ten companies were studied during the sample period of January 1998 to December 2000. The starting date is just around the beginning of the Internet bubble, and the ending date corresponds to the time when this bubble was coming to an end. The firms selected were as follows:

- 1) Amazon.com (AMZN)
- 2) America Online (AOL)
- 3) Cisco Systems (CSCO)
- 4) International Business Machines (IBM)
- 5) Intel Corporation (INTL)
- 6) Lucent Technologies (LU)
- 7) Microsoft Corporation (MSFT)
- 8) Siebel Systems (SEBL)

9) Sun Microsystems (SUNW)

10) Yahoo! Inc. (YHOO)

These companies were selected because there is copious information (historical news as well as prices, trading volumes, etc, during the period studied.) available about them in the market, they are actively traded stocks so these stock present a large circulation volume, which makes it easier to see changes in prices given the different information supplied. The historical prices of these company's' stocks were followed daily for the period mentioned before, and also the different price movements that occurred when different news about these companies was released. The daily historical prices were collected using the database provided by the Center for Research in Security Prices of the University of Chicago (CRSP), and the companies' financial statements were provided by COMPUSTAT North America. A total of 302,440 observations (stock prices, trading volumes, holding period returns, betas, market return, etc) were analyzed as well as the company stocks quarterly financial statements for the years 1998, 1999 and 2000. Since the prices of stocks are constantly moving, for the purpose of this study, only those changes of 3% (positive or negative) or more in stock prices were taken into account. The company news were collected utilizing EBSCO Business Complete, which is a large historical news database. This database provides historical news about companies; the information comes from different news sources such as periodicals (The Wall Street Journal, New York Times, etc) business magazines, business journals, and other business related

publications. A total of 3,665 news were gathered and examined for the years 1998, 1999 and 2000. After sorting the stock prices and returns and eliminating those returns that represented changes between 3% and -3%, the total of observations was reduced to (3,001).

The software SPSS was used for the statistical analysis in the study.

Method Selected to Measure Changes in Stock Prices and Return

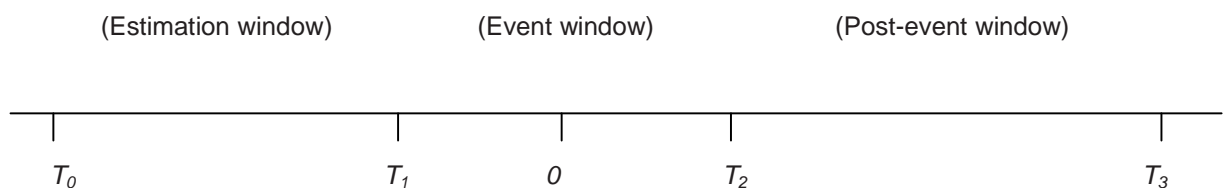
The method selected to measure changes in stock prices and return was the Event Study methodology. This methodology measures the impact unexpected events have in a company's stock price and return. This method allows appreciating better if the changes in prices were due to the financial strength of the company or if those changes were caused by the unexpected event. Utilizing event studies one can see the impact an unexpected event has over the price of the stock, and also we can measure what is the abnormal return, if any, observed around the date when the news was released. It is important to mention that a change in price, positive or negative, causes a change in the return of the company stock.

The Event Studies methodology¹⁶ has been used by different researchers. As observed in the papers studied, the researchers take a sample of similar events that occurred in different companies at different times and determine how, on average, this event impacted the stock price. The event study techniques were

¹⁶ The Event Study Web Page. <http://web.mit.edu/doncram/www/eventstudy.html>

first applied to stock splits, but quickly expanded into other areas. For example, Johnson, Magee, Nagarajan, and Newman (1985) studied stock market reactions to executive deaths and found that unexpected CEO deaths are associated with stock price decreases. Other examples in which this methodology has been applied are to study the effects of mergers and acquisitions, announcement of macroeconomic variables, new debt or equities issues, earnings announcements, the field of law and how the regulatory environment affects the value of the firm. There exist two basic models for modeling the normal return in order to investigate the abnormal return. These models are the *constant mean return model* and the *market model*. The constant mean return model assumes that the return of a security is constant over time, while the market model relates the return of the security with the return of the market. For this study the market model was chosen over the constant mean return model since it helps to reduce the variance of the abnormal return.

The time line for an event study is as follows:



The Event Study market model is as follows (MacKinlay 1997):

$$(1) \quad R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it} \quad 17$$

$$E[\varepsilon_{it}] = 0 \quad \text{Var}[\varepsilon_{it}] = \sigma_{\varepsilon_i}^2$$

Where R_{it} and R_{mt} are the period t returns on security j and the market portfolio, respectively, and ε_{it} is the zero mean disturbance term. α_i , β_i and $\sigma_{\varepsilon_i}^2$ are the parameters of the market model. For the purpose of this study the CRSP equally weighted portfolio was used as the market portfolio. The estimation window observations can be expressed as a regression system,

$$(2) \quad R_i = X_i \theta_i + \varepsilon_i$$

Where $R_i = [R_{iT_0+1} \dots R_{iT_1}]'$ is an $(L_1 \times 1)$ vector of the estimation windows returns, $X_i = [\mathbf{1} \ R_m]$ is an $(L_1 \times 2)$ matrix with a vector of ones in the first column and the vector of market return observations $R_m = [R_{mT_0+1} \dots R_{mT_1}]'$ in the second column, and $\theta_i = [\alpha_i \beta_i]'$ (2x1) parameter vector. Under general conditions ordinary least squares is a consistent estimation procedure for the

¹⁷ The sensitivity of a security to changes in the market (β_i) is given by the following equation:

$$\beta_i = \frac{\sum_{t=T_0+1}^{T_1} [(R_{it} - \hat{\mu}_i)(R_{mt} - \hat{\mu}_m)]}{\sum_{t=T_0+1}^{T_1} [(R_{mt} - \hat{\mu}_m)^2]}, \quad \alpha_i = \hat{\mu}_i - \hat{\beta}_i \hat{\mu}_m, \quad \sigma_{\varepsilon_i}^2 = \frac{1}{L_1 - 2}$$

$$\Sigma_1(t = T_0 + 1)^T(T_1 \mathbf{1}) \equiv [(R_{1it})' \quad \hat{\alpha}_i + \hat{\beta}_i R_{mt})^2$$

where, $\hat{\mu}_i = \frac{1}{L_1} \sum_{t=T_0+1}^{T_1} R_{it}$ and, $\hat{\mu}_m = \frac{1}{L_1} \sum_{t=T_0+1}^{T_1} R_{mt}$. $L_1 = T_1 - T_0$ and $L_2 = T_2 - T_1$, Where L_1 and L_2 are the length of the estimation window and the event window respectively.

market model parameters. The OLS estimators for the model parameters using an estimation window of L_1 observations are,

$$(3) \quad \hat{\theta}_t = \left[(X_t' X_t) \right]^{-1} X_t' R_t$$

$$(4) \quad \hat{\sigma}_{\hat{\varepsilon}_t}^2 = \frac{1}{L_1 - 2} \hat{\varepsilon}_t' \hat{\varepsilon}_t$$

$$(5) \quad \varepsilon_t = R_t^* - X_t' \theta_t$$

$$(6) \quad \text{Var} \left[\hat{\theta}_t \right] = \left[(X_t' X_t) \right]^{-1} \sigma_{\hat{\varepsilon}_t}^2$$

Thus let $\hat{\varepsilon}_t^*$ be the $(L_2 \times 1)$ sample vector of abnormal returns for security i from the event window $T_1 + 1$ to T_2 . Using the market model we have that the abnormal return vector is:

$$(7) \quad \hat{\varepsilon}_t^* = R_t^* - (\hat{\alpha}_j \iota + \hat{\beta}_j R_m^*)$$

$$(8) \quad = R_t^* - X_t' \hat{\theta}_t$$

Where $R_t^* = [R_{iT_{1+1}} \dots R_{iT_2}]'$ is an $(L_2 \times 1)$ vector of event window returns, $X_t^* = [\iota \quad R_m^*]$ is an $(L_2 \times 2)$ matrix with a vector of ones in the first column and the vector of market return observations $R_m^* = [R_{mT_{1+1}} \dots R_{mT_2}]'$ in the second column, and $\hat{\theta}_t = [\hat{\alpha}_t \hat{\beta}_t]'$ (2×1) parameter vector estimate.

$$\begin{aligned}
(9) \quad E[\hat{\varepsilon}_i^* | X_i^*] &= E[R_i^* - X_i^* \hat{\theta}_i | X_i^*] \\
&= E[(R_i^* - X_i^* \theta_i) - X_i^* (\hat{\theta}_i - \theta_i) | X_i^*] \\
&= 0
\end{aligned}$$

$$\begin{aligned}
(10) \quad V_i &= E[\hat{\varepsilon}_i^* \hat{\varepsilon}_i^{*'} | X_i^*] \\
&= E[(\varepsilon_i^* - X_i^* (\hat{\theta}_i - \theta_i))(\varepsilon_i^* - X_i^* (\hat{\theta}_i - \theta_i))' | X_i^*] \\
&= E[(\varepsilon_i^* \varepsilon_i^{*'} - \varepsilon_i^* (\hat{\theta}_i - \theta_i)' X_i^{*'} - X_i^* (\hat{\theta}_i - \theta_i) \varepsilon_i^{*'} + X_i^* (\hat{\theta}_i - \theta_i)(\hat{\theta}_i - \theta_i)') | X_i^*] \\
&= \mathbf{I} \sigma_{\varepsilon_i}^2 + X_i^* (X_i^{*'} X_i^*)^{-1} X_i^{*'} \sigma_{\varepsilon_i}^2
\end{aligned}$$

\mathbf{I} is the $(L_2 \times L_2)$ identity matrix. From the equation above (9) we can see that the abnormal return vector with an expectation of zero is unbiased. The covariance matrix of the abnormal return vector (10) has two parts, the first term in the sum is the variance due to the future disturbances and the second term is the additional variance due to the sampling error in $\hat{\theta}_i$. Under the null hypothesis H_0 , that the given event has no impact on the mean of variance of returns we can use equations (9, 10) and the joint normality of the abnormal

returns to draw inferences. Under H_0 for the vector of event window sample returns we can get that

$$(11) \quad \varepsilon_{it}^* \sim N(0, V_{it})$$

In order to draw inferences for the event of interest, the abnormal return observations must be aggregated. The aggregation must be done through time and across securities. The individual securities abnormal return can be averaged using $\hat{\varepsilon}_i^*$. Given a sample of N events, defining $\bar{\varepsilon}^*$ as the sample average of the N abnormal return vectors, we have

$$(12) \quad \bar{\varepsilon}^* = \frac{1}{N} \sum_{i=1}^N \hat{\varepsilon}_i^*$$

$$(13) \quad \text{Var}[\bar{\varepsilon}^*] = V = \frac{1}{N^2} \sum_{i=1}^N V_i$$

The elements of the average abnormal returns vector can be aggregated through time as follows. We can define $CAR_{\gamma}(t_1, t_2)$ as the cumulative average abnormal return from t_1 to t_2 where $T_1 < t_1 \leq t_2 \leq T_2$ and γ represents an $(L_2 \times 1)$ vector with ones in positions $t_1 - T_1$ to $t_2 - T_2$ and zeroes elsewhere. Thus for the cumulative abnormal return we have:

$$(14) \quad \overline{CAR}(t_1, t_2) \equiv \gamma \cdot \bar{\varepsilon}^*$$

$$(15) \quad \text{Var}[\overline{CAR}(t_1, t_2)] = \sigma^2(t_1, t_2) = \gamma V \gamma$$

To obtain $\overline{CAR}(t_1, t_2)$ we can aggregate using the sample cumulative abnormal return for each security i . For N events we have:

$$(16) \quad \overline{CAR}(t_1, t_2) = \frac{1}{N} \sum_{i=1}^N \widehat{CAR}_i(t_1, t_2) \quad 18$$

$$(17) \quad \text{Var}[\overline{CAR}(t_1, t_2)] = \bar{\sigma}^2(t_1, t_2) = \frac{1}{N^2} \sum_{i=1}^N \sigma_i^2(t_1, t_2)$$

The cumulative abnormal return inferences can be drawn using,

$$(18) \quad \overline{CAR}(t_1, t_2) \sim N\left(0, \bar{\sigma}^2(t_1, t_2)\right)$$

since under the null hypothesis the expectation of the abnormal returns is zero.

Since $\bar{\sigma}^2(t_1, t_2)$ is unknown, we can use $\hat{\bar{\sigma}}^2(t_1, t_2) = \frac{1}{N^2} \sum_{i=1}^N \hat{\sigma}_i^2(t_1, t_2)$ as a

consistent estimator. We can now proceed to test H_0 , which is expected to be

zero (0) by using:

¹⁸ Define $\widehat{CAR}_i(t_1, t_2)$ as the cumulative abnormal return for security i from t_1 to t_2 where $T_1 < t_1 \leq t_2 \leq T_2$. Let V represent an $(L_2 \times 1)$ vector with ones in positions $t_1 - T_1$ to $t_2 - T_2$ and zeroes elsewhere. Then we have $\widehat{CAR}_i(t_1, t_2) \equiv V' \varepsilon_i^*$ and $\text{Var}[\widehat{CAR}_i(t_1, t_2)] = \sigma_i^2(t_1, t_2) = V' V_i V$. Under H_0 we have that $\widehat{CAR}_i(t_1, t_2) \sim N(0, \sigma_i^2(t_1, t_2))$.

$$(19) \quad J_1 = \frac{CAR(t_1, t_2)}{[\sigma^2(t_1, t_2)]^{\frac{1}{2}}} \sim N(0, 1)$$

If the result of J_1 is different than zero (0) then the event being tested has an impact over the return of the stock, and therefore there exists abnormal returns.

News Classification and Groups

The news observed were classified in different categories described as follows:

Financial News (NF)

News that were pertaining to the internal finances of the company or its fundamental value, were classified as financial news (NF). For example, earning per share announcements, earning announcements, changes in sales, changes in company earnings, changes in dividend policies, dividend announcements, merger and acquisitions, issuing of additional stock, stock repurchase, stock splits, etc. In this group it was also taken into account improvements to stock recommendations and ratings by investment firms since these recommendations are mostly based on the fundamentals of the company.

Research and Development News (RD)

News were classified as Research and Development if the information contained on the news was about the research and development of new products by the company.

Marketing News (NM)

This group was comprised of news about the launch and marketing of new products by the company. It also included projects done in conjunction with other companies to launch new products, strategic alliances, etc. For this type of news it was important to distinguish between the date of the news and the actual date of the product being launched to the market.

Human Resources News (HR)

News were classified as human resources news if the information conveyed by the news was about “downsizing” or employee layoffs, closing of manufacturing plants, hiring of new management or any other news concerning changes in management.

The purpose of dividing the news in different categories is to observe which kind of news has a stronger impact on investors’ perception, stock prices and returns. As mentioned before, this should be of great help to future investors, investment professionals and researchers in general, because they can have a better grasp on which type of news and information affects their investments, stock prices and returns the most.

CHAPTER 4

ANALYSIS AND RESULTS

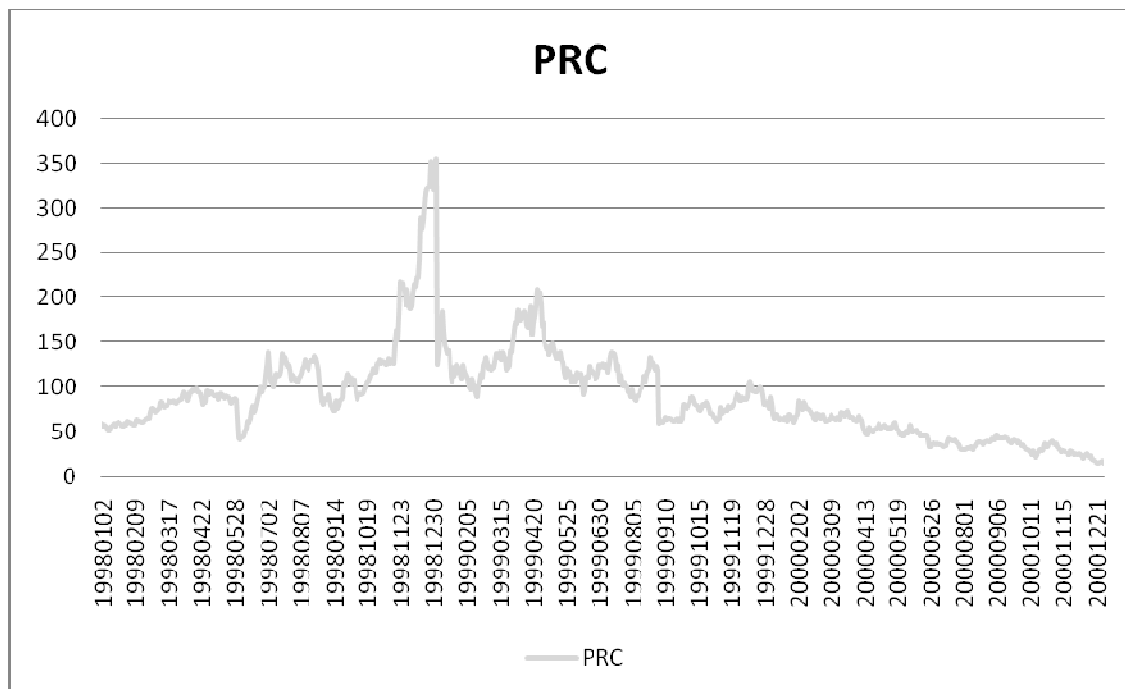
The impact of news over the company stock prices, returns and changes in volumes are analyzed in this chapter. Also shown are the results of the impact of news over stock prices, returns and volumes divided by news categories. A company by company analysis is done to have a more comprehensive and rounder study.

Amazon.com (AMZN)

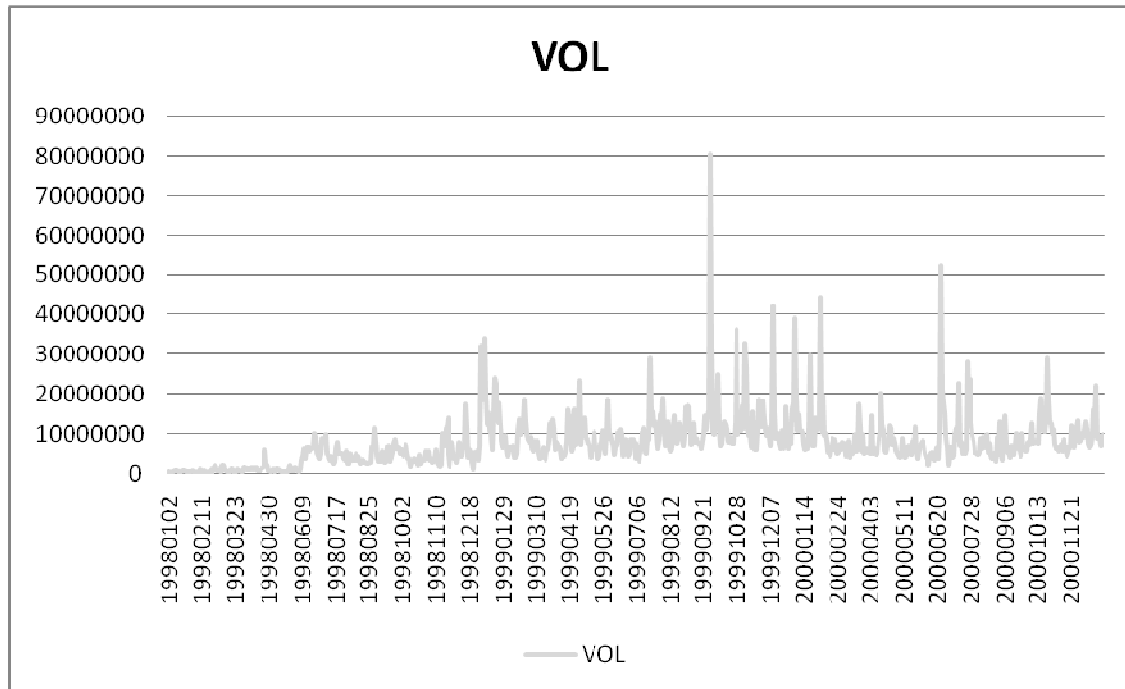
Amazon.com, company ticker¹⁹ AMZN, was the biggest Internet based sales provider during the period studied. The company sells a wide arrange of products that goes from books to Compact Discs, DVD's and music in general. The company makes all it sales through the Internet, providing their customer the comfort of shopping without leaving their homes. During the studied period of January 1998 to December 2000 Amazon's net income (loss) changed from \$(46.427) million at the end of the fourth quarter of 1998 to \$(545.14) million at the end of the fourth quarter 2000. Amazon.com increased its sales from \$252.893 million to \$972.36 million for the same period, as more and more consumers adventured to make their shopping through the Internet. Amazon had

¹⁹ The company ticker is the symbol by which a company stock is identified in the stock market.

expenditures of \$283.134 million at the end of the fourth quarter 2000 which represented an increase of \$253.85 million from the same quarter in 1998. This increase was mainly due to an acquisition totalizing \$222.85 million. Amazon's stock had a book value of \$1.70, and the lowest price the company stock registered in the market during the period studied was \$15.187 (Dec. 21, 2000), and the highest price the stock registered during the same period was \$354.93 (Jan. 4, 1999). The stock beta²⁰, as provided by CRSP, for the company stock was 1.782 for the year 1998, 1.811 for 1999 and 1.476 for 2000. The average daily trading volume for the period studied was 7,585,441. The lowest level of trading volume registered for the company stock during the period studied was 103,712 and the highest trading volume registered during the same period was 80,380,734.



²⁰ Beta is a measure of risk, it measure the sensitivity of the stock price to price movements in the market.



The company had a price-earnings ratio²¹ for this period of 111.11 (P/E Ratio). Amazon's shares had a market capitalization of \$5.57 billion for the period studied, and 357.14 million outstanding²² stocks at the end of the year 2000. It is interesting to notice that at the moment that Amazon experienced its highest stock price the market capitalization for the company stock was \$57.28 billion. The company had losses after taxes of (\$1411.27 million), sales totaling \$2761.98 million, total assets of \$2135.16 million for the year ended Dec. 31 2000. Amazon's earnings per share (EPS) for the fourth quarter of the year 2000 was (\$1.53). If we look at the company stock's p/e ratio we can see that the stock is overvalued, and that the stock's market price is not supported by the company's financial state. It should also be mentioned that when a company's p/e ratio is high, it means that the public have a positive outlook or expectation

²¹ The price earnings ratio is price divided by earnings.

²² Outstanding stock is the company shares that are in the hands of the public, or (issued stocks – treasury stocks) = outstanding stocks.

about the future financial performance of the firm. This probably indicates a positive expectation about the growth of Internet sales in the near future. We should also observe that the company stock beta is close to double that of the market²³, this means that the company stock price is more volatile than the market. Even when these factors are taken into account, many investment banks, and investment firms such as Bank of America Securities, Merrill Lynch, Prudential Securities and others, had Amazon's stock classified with a rating of "Strong Buy" during the period studied. This means that the investment professionals recommended the general public to buy Amazon's stock. Let's see the effect of news over the price, return, and volume on Amazon's stock.

On October 8 1998 a news was released **(NM)** on the Los Angeles Times (NM news group) in which it was reported that Amazon would face new competition from two rivals that would merge (N2K and CDnow), this merger would make this two companies the biggest sellers of music on the Internet. The day that this news was released Amazon's stock experienced a drop in stock price from \$93.4375 to \$86.1875, given Amazon's beta of 1.7829 and utilizing the equally weighted market return of - 3.764%, an abnormal return of negative 1.819% is observed.

In this case the news released seemed to have a negative effect over Amazon's stock. The trading volume for the same day was 5,099,507 shares On November 18, 1998 it was published in the New York Times **(NM)** that Amazon would expand the merchandise selection offered through their Internet site. In addition to the products already offered, Amazon would also offer electronics, video

²³ The stock market beta, by definition, is always 1.

games and toys. The day the news was released Amazon's stock price rose from \$148.50 to \$164, and a trading volume of 9,965,777 shares. The abnormal return observed during the day was 9.09%.

The first of December, 1998 it was published in the New York Times **(NM)** that a deal between Amazon.com, Broadcast.com and Hoovers online was reached. The deal accorded that Broadcast and Hoover could place marketing ads in Amazon's web site, and in turn Amazon could sell its products through Broadcast and Hoover. The day the news was released the company's share price rose from \$192 to \$209.50, and the trading volume for the day was 7,949,560. The abnormal return observed for the day was 8.51%.

On December 21, 1998 it was published in different sources **(NF)** that Amazon had a income of \$147.8 million and that the expected sales for the company in five year should reach a level of \$10 billion. The price of the company's stock rose from \$286.68 to \$318.75. The trading volume for the day was 5,666,778 shares. The abnormal return observed was 10.26%.

On January 6 1999 it was published in The Wall Street Journal **(NF)** that during the Christmas season, Amazon's total sales had triple, when compared to the previous year. A record \$6 million was sold in one day and \$250 million for the trimester. The article also stated that even with that level of sale Amazon.com had not reported earnings, and this was due to large investments in marketing and client services. The price of Amazon's shares increased from \$124.50 to \$138, and the trading volume for the day was 18,445,464 shares. The abnormal return observed for the day was 7.3796%.

The Wall Street Journal released an article **(NF)** on January 27, 1999 that stated that Amazon.com and Ebay.com had gone through an amazing growth period during the months of October-December of the previous year, showing great optimism towards the company's stock. Amazon's share price increased to \$125.625. and the trading volume for the day was 17,793,096 shares. The abnormal return observed was 9.40%.

It is interesting how the abnormal return observed overcompensated for the decrease of the market, and provided a higher yield for Amazon's stock. On February 24, 1999 an article was published by the New York Times **(NF)** that stated that Amazon.com had acquired 7% of GeoWorks shares, GeoWorks' stock increased by 56%, according to the New York Times. Usually, when a company is acquired, the price of its' shares increase. Amazon's company stock experience a decrease from the previous day, from \$115.1875 to \$110.9375, and the observed trading volume for the day was 12,670,652. The abnormal return observed was – 3.73%.

Barron's published an article on March 1, 1999, that based on a previous article **(NF)** in which it was states that Amazon.com would buy 40% participation on Drugstore.com, investors started to sell Walgreens and Rite Aid stocks, both from the pharmacy retailing sector. Barron's reported that apparently the general public perceived that the acquisition on the part of Amazon, could affect Walgreens and Rite Aid's potential sales. The day this article was released Amazon's share prices increased to \$133, the trading volume for the day was 9,849,507, and the abnormal return observed was 3.14%.

On March 10, 1999 it was reported **(NM)** in the Wall Street Journal that Amazon.com and Dell Computers would merge their web sites so that Amazon users could buy Dell's products through Amazon's website and vice versa. Amazon's shares increased from \$129.9375 to \$137.125, and the trading volume for the day was 7,175,100. The abnormal return observed was 3.56%.

An article was published in The New York Times **(NM)** on March 31, 1999, in which it was reported that Amazon.com was planning to offer auctions services to its consumers and small businesses. The article also stated that the auctions market through the Internet was a \$20 billion business, and it was controlled by Ebay.com, the only real competitor that Amazon would face if it decided to enter to the auctions market. Amazon company stock price rose from \$164.6875 to \$172.1875, the trading volume during that day was 11,258,616 shares, and the abnormal return observed was 4.11%.

On April 21, 1999 an article was published in different sources **(NM)** that Amazon.com was planning on entering the food retailing business through the Internet, the company would achieve this plan by investing in the company Homegrocer.com, which was a provider of groceries through the Internet. Amazon's stock increases from \$172 to \$179.25 during the day. The trading volume for the day was 5,588,511 shares. The abnormal return observed was .09%. Apparently, most of the changes in prices for Amazon on this day, were mainly due to changes in overall market returns.

On April 29, 1999 it was published **(RH)** on different periodicals that Amazon.com and Wal Mart had resolved a legal case out of court, the amount that Amazon

accorded to pay for the settlement was not disclosed. On that day Amazon's stock declined from \$193.50 to \$168.25, and the trading volume for the day was 23,420,352 shares. The abnormal return observed during the day was -14.46%.

The New York Times published an article **(NM)** on June 15, 1999 in which it was stated that Amazon.com would enter in two new ventures, selling electronic products and toys through their web site. The projected sales for toys were \$52 million and the projected sales for electronics were \$78 million. The price of the company increased from \$92 to \$96.50, and the trading volume for the day was 9,289,223 shares. The abnormal return observed was 4.42%

On September 14, 1999 an article was published **(NF)** in Barron's in which it was commented that Merrill Lynch, one of the biggest investment banks in the United States, that it would incorporate to their portfolios, as well as sell corporate bonds from America Online and Amazon.com. It is interesting to point out that America Online corporate bonds at the time, had a credit rating of AA and Amazon's corporate bonds had a credit rating of CCC²⁴. The company's stock price increased from \$63.3125 to \$66, the trading volume for the day was 8,886,067, and the abnormal return observed was 3.98%

This financial news is very interesting because Merrill Lynch was giving the same level of confidence to Amazon's corporate bonds as to the America Online funds, displaying their trust in the future of Amazon's businesses, disregarding the fact that the company was not generating any revenue during the time. On

²⁴ Credit ratings are assigned to corporate bonds according to the company's default and liquidity risk, Ratings usually range from AAA down to D, AAA being a high quality bond, with little credit risk. Bonds rated below BBB are considered "speculative bonds" or "junk bonds" given their higher default risk, this types of bonds pay higher interest rates to compensate for the higher risk being assumed by the investor.

September 29, 1999 it was published **(RH)** in the Los Angeles Times that on that same day Amazon.com would invite independent salesmen to offer their products through the company web site, creating a virtual shopping center. According to the Los Angeles Times, the article published caused investors to demand high quantities of Amazon's shares in the financial market, causing an increase in stock prices from \$65.875 to \$80.75. The article stated that Amazon would charge interested vendors \$9.99 monthly, to allow them to sell their products through Amazon's web site. The trading volume for the day was 80,380,734. The abnormal return observed during the day was 22.70%.

On January 6, 2000 the Wall Street Journal reported **(NF)** that Amazon.com had experienced an increase in revenues when compared to the previous year, but the article also stated that Amazon still had serious problems related to inventory costs. Amazon stock price decreased from \$69.75 to \$65.5625. The trading volume registered for the day was 18,977,420 shares, and the abnormal observed on this day was -7.438%.

On January 11, 2000 the Wall Street Journal reported **(NF)** that Kozmo.com would get \$100 million by a group of investors led by Amazon.com. Kozmo.com used to deliver snacks, movies and other items through the Internet. Amazon's share price decreased during the day by 3.52%, to \$66.75. The trading volume registered for the day was 10,638,588 shares, and the abnormal return observed during the day was -3.396%

Interactive Week reported **(NM)** on January 31, 2000 the details of different partnerships formed between Amazon and different Internet companies, as well

as the advantages derived by Amazon from such partnerships. Amazon's shares experienced an increase in price from \$61.875 to \$64.5625. The trading volume registered for the day was 10,875,621 shares and the abnormal return observed was 4.68%.

On February 3, 2000 it was reported **(NF)** by the Wall Street Journal that Amazon's officials had predicted narrower deficits for the year 2000. Amazon's shares increased to \$84.1875, a 21.24% rise. The trading volume registered for the day was 44,259,436 shares and the abnormal return observed was 18.47%.

The increase in price experienced by Amazon's shares was very impressive, considering the fact that the company had not reported revenues, and the no real "new news" was being released, only the opinion of high officials in the company.

Apparently investors perceived the news and the official's comments as a positive signal about the firm's future judging from the increase in trading volume level. On February 4 2000, an article was published **(NF)** in the Wall Street Journal which stated that on previous days Amazon's share price had experienced a very high increase, and it seemed that investors had ignored the problems and losses that the company had experienced on their loan portfolio.

On that day Amazon's share price decreased from \$84.1875 to \$78.5626. The trading volume for the day was 11,150,410 shares and the abnormal return observed during the day was -8.44%.

On July 27, 2000 it was reported **(NF)** in different financial news sources that Amazon.com had fell short of investors' revenue expectations. The news also expressed analyst's concerns about the future of the company and its slowing

growth. On this day the company stock price decreased by 13% from \$36.0625 to \$31.375. The trading volume for the day was 23,771,596 shares and the abnormal return observed was -11.77%.

On August 14, 2000 an article **(NM)** was published in Info World, in which it was reported that Amazon.com and Toys R' Us were starting a joint venture where Amazon would sell Toys R' Us toys through its web site. On this day the company's share increased in price by 3.52% to \$34.875. The trading volume for the day was 6,325,170 shares and the observed abnormal return was 1.91%.

Publishers Weekly reported **(NF)** on August 21, 2000 on the decreased value of Amazon's partnering strategy due to the bankruptcy liquidation filed by its partner Living.com. Amazon's share price decreased on this day by 3.84% to \$37.50, the trading volume for the day was 4,098,045 shares and the observed abnormal return was -4.918%.

On September 21, 2000 the Wall Street Journal commented on an article **(NM)** how the method used by Amazon.com to become one of the Web's largest retailers had won the loyalty of millions of consumers, and how the model created was still the best one around. On this date the company stock price increased from \$37.50 to \$40.0625. The trading volume for the day was 7,354,056 shares and the observed abnormal return during the day was 7.07%.

Interactive Week reported **(NM)** on October 2, 2000 about the losses of members of the Amazon Commerce Network (ACN), how the bankruptcy of Gear.com and Living.com had affected the company and how a renegotiation of a deal with Drugstore.com could help Amazon's future. On this date the company stock price

decreased by 6.67% to \$35.875. The trading volume for the day was 5,565,627 shares and the observed abnormal return was -5.69%.

On October 11, 2000 it was reported **(NM)** on the Wall Street Journal that Amazon and Sotheby's Holdings would close their co-branded web site that sells art and collectibles online. The article also informed about the different problems that plagued the web site. On this day the company stock price decreased from \$30.0625 to \$27.8125. The trading volume registered for the day was 7,960,004 shares and the observed abnormal return was -6.79%.

Computer World reported on November 13, 2000 about changes **(NM)** in Amazon's privacy policy, and how these changes raised concerns on its customers. On this day Amazon's share price decreased by 7.484% to \$27.8125. The trading volume registered for the day was 8,450,011 shares and the observed abnormal return was -6.385%.

On November 27, 2000 eWeek reported **(NM)** how consumers were receiving unsolicited electronic mail or spam mail, from Amazon.com. On this date Amazon's stock price decreased by 3.24% to \$28. The trading volume for the day was 6,478,294 shares and the abnormal return observed during the day was -3.32%.

Wireless Week announced **(NM)** on December 4, 2000 the opening of the wireless online store by Amazon.com, the article also detailed the services that would be offered through the web site. On this day the company share price increased by 7.86% to \$26.5625. The trading volume during the day was 8,358,607 shares and the observed abnormal return was 8.71%.

The Wall Street Journal reported **(NM)** on December 5, 2000 about different complaints received by the United States Federal Trade Commission against the revised customer privacy policy of Amazon.com. On this date the company share price decreased from \$26.5625 to \$25.375, the trading volume registered for the day was 10,124,085 shares and the abnormal return observed was -9.302%.

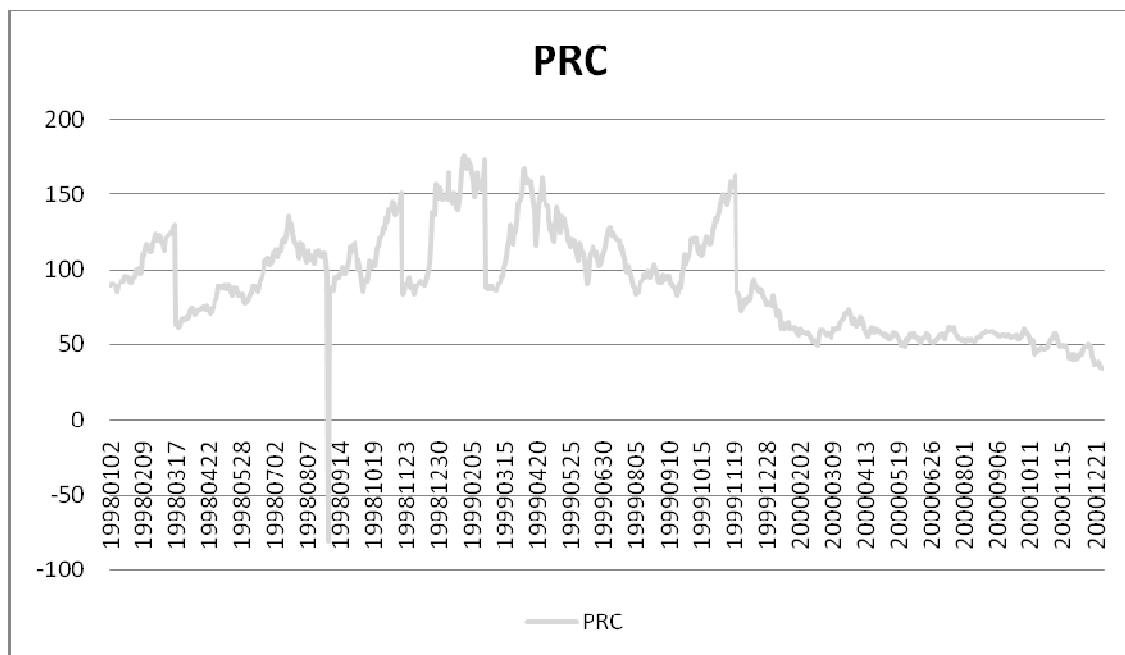
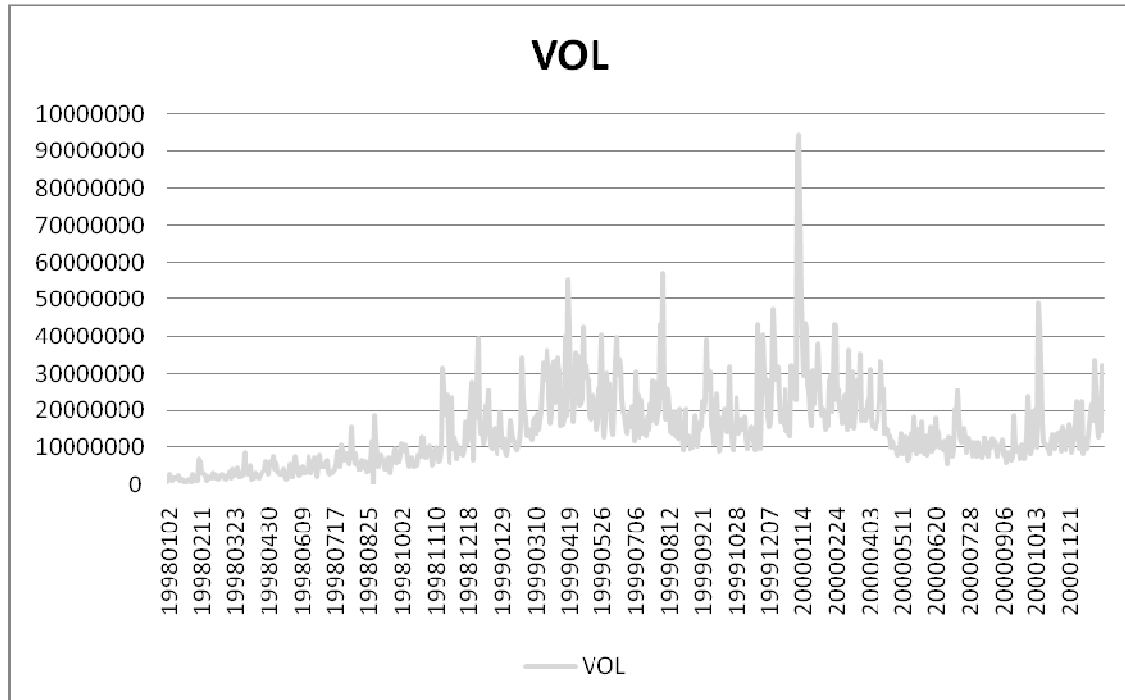
The Wall Street Journal reported **(NM)** on December 21, 2000 that Amazon.com had opened a retail outlet on its web site to sell close-out and overstock items. On this day Amazon's stock price decreased from \$16.6875 to \$15.1875, the trading volume for the day was 8,960,905 shares and the abnormal return observed during the day was -9.017%.

America Online (AOL)

America Online, company ticker AOL, it later changed to TWX once the merger with Time Warner was finalized²⁵, used to provide interactive services, Internet technology, and e-commerce services. The company operated during the studied period two Internet providers that gave worldwide services, America Online and CompuServe, as well as other lesser known Internet companies. For the quarter ended on December 30 2000, the company had net income of \$338 million. Total sales for the same period were \$1929 million. This increase from the previous quarter was mainly due to an increase of subscribers to the services offered combined with a decrease of marketing costs. The highest company stock price registered during the period studied was \$175.75 (Jan. 29, 1999) and the lowest company stock price registered was \$34.8 (Dec. 29, 2000). The average daily

²⁵ The company merged with Time Warner Inc. after 2000..

trading volume for the period studied was 14,679,662. The lowest level of trading volume registered during the same period was 801,900 (Jan. 23, 1998) and the highest trading volume observed during this period was 94,586,896 (Jan. 11, 2000)



The P/E ratio of the company during this period was 232. The company stock beta for the year 1998 was 2.3107, for 1999 the beta was 2.37253, and for the year 2000 the company stock beta was 1.33823. The company had 2316.494 million common stocks outstanding, at the end of the fourth quarter of the year 2000. AOL's total assets for the year ended December 30, 2000 was \$10.673 billion, its sales at the end of the year 2000 were \$6.886 billion, the company had expenditures of \$1.941 billion, a pretax income of \$2.014, and a net income of \$1.232 billion for the same period. The return on assets (ROA) for the company during the same period was 11.54% and the return on equity (ROE) was 19.99%.. The ROA and ROE for the quarter ended on December 2000 were 3.16% and 5.48% respectively. America Online had a market capitalization for the same period of \$80.613 billion and during the same period it was one of the few Internet companies that were actually producing revenues. AOL's (EPS) for the last quarter of the year 2000 was \$0.15, and the company had total sales for the same period of \$1.91 billion. It should be noticed that the company beta was more than twice the market beta, which makes this stock a risky one, based on its volatility. Even taking into account the high company beta, and its high P/E ratio, the company stock was given a "Strong Buy" recommendation by JP Morgan and CIBC World Markets. The high stock price and its P/E ratio were due to the fact that during this period Internet subscribers were expected to double or even triple in the subsequent years. Since America Online was one of the largest Internet providers in the world it was expected that the company Internet subscribers would increase at the same rate as the Internet total subscribers.

Let's see the effect of news over the price, return, and volume on America Online stock during the studied period of January 2, 1998 to December 29, 2000.

On October 8, 1998 an article was published in The Wall Street Journal **(NM)** that America Online (AOL) was expecting to start providing its services in Australia. The stock price of the company decreased from \$92 to \$85.50, the trading volume for the day was 10,778,000, and the abnormal return observed during the day was 0.8%.

In this case it is interesting to notice that the changes observed in the company stock price were mainly caused by changes in the market return, and the high company beta of 2.3107. On March 25 1999 it was published **(NF)** in The New York Times that Ebay.com would pay AOL \$75 million for the rights to advertise its services through AOL' web site. AOL's stock price increased from \$117.125 to \$126.50, the trading volume for the day was 23,544,592 shares. The abnormal return observed for this day was 3.65%.

On April 5, 1999 an article was published **(NF)** in Business Week in which it was reported how they expected for AOL to be the next Internet giant. It was also reported that AOL, at that moment, had 16 million subscribers, and how Netscape, an AOL company, was the leader in Internet software. AOL's share price increased from \$144.50 to \$166.9375, the trading volume for the day was 26,786,896 shares and the abnormal return observed was 9.31%

The New York Times published an article **(NF)** on April 7, 1999 where it was reported that AOL had acquired When Inc., an Internet company that provided virtual calendars. The amount which AOL paid for the acquisition was not

disclosed. AOL's share price decreased to \$158, and the trading volume for the day was 33,010,288 shares. The abnormal return observed was -7.43%.

Apparently investors did not perceived the acquisition as a good investment, driving them to sell AOL's shares and increasing the trading volume for the day by nearly 7,000,000 shares, when compared to the previous day. It is interesting to point out that When Inc. had not registered revenue up to the point of the acquisition. On April 22, 1999 it was published **(NF)** in the New York Times that Sprint would buy \$90 million in AOL's shares. AOL's stock price increased from \$142.75 to \$148.6875, the trading volume registered during the day was 25,234,896 shares, and the abnormal return observed was .96%.

It is important to point out that on this study the vast majority of the companies being acquired, even if the acquisition was only partial, experienced an increase in stock prices, as it is observed in this example. On June 1, 1999 it was reported **(NF)** by different sources that AOL would pay \$400 million for the acquisition of Spinner Networks and Null Soft Inc's shares, both providers of music through the Internet. AOL's stock price decreased to \$113.125. The trading volume registered for the day was 17,456,688 and the abnormal return registered was -6.29%.

On June 14, 1999 an article was published **(NM)** in Business Week that AOL would face strong competition from Freeserve, a British Internet company that offered its Internet services for free. The article reported that in less than a year Freeserve had already amassed a total of 1.1 million users, more than what AOL was able to attract during the same year. AOL's stock price decreased to \$90.50,

from \$99.50, the trading volume during the day was 40,113,392, a total of nearly 7,000,000 more shares traded than the previous day. The abnormal return observed during the day was -8.91%.

On August 13, 1999 different **(NM)** news sources reported that AOL and Novell Inc. would join forces, making their respective Internet services compatible with each other. AOL's stock price increased from \$92.375 to \$96.875. The trading volume registered for the day was 14,528,599 shares and the observed abnormal return was .04%.

Interactive Week reported on September 27 1999 **(NF)** that EarthLink and MindSpring would merge in order to compete with AOL. The article also stated that even with the merger the competition that the new company would represent to AOL was not very significant, since AOL was well established and better known to the general public than its competitors. On that day AOL stock increased from \$97.50 to \$101.125 and the trading volume registered for the day was 25,721,696 shares. The abnormal return observed was .79%.

On September 28, 1999 different news sources reported **(NM)** that AOL was preparing to launch its services in Hong Kong; this would serve as the entry point to the Asian market. On that day AOL's shares increased from \$101.125 to \$109.875. The volume increased by a little more than 5,000,000 from the previous day registered volume, to 30,913,088 shares. The abnormal return registered during that day was 8.37%.

Apparently the news was well received by the investors as they saw the tremendous opportunity that having access to the Asian market would present to

AOL's future. On October 6, 1999 different news sources reported **(NM)** that AOL would launch its 5.0 version of their Internet access software. The new software would permit users to access the Internet through cellular phones and televisions prepared for Internet access. AOL's stock increased from \$113.50 to \$120, the trading volume for the day was 21,248,288 and the abnormal return observed was 2.90%.

On January 11, 2000 the Wall Street Journal reported **(NF)** on the effects of a possible merger between Microsoft and AT&T on America Online and its merger with Time Warner. On this date AOL's stock price decreased by 10.95% from the previous day to \$64. The trading volume registered for the day was 94,586,896 shares and the observed abnormal return was -11.88%.

The Wall Street Journal reported **(NF)** on February 23, 2000 on the agreement of HomeGrocer.com to pay for the marketing of its grocery-delivery service to AOL members. On this date AOL's stock price increased by 16.03% from the previous day to a price of \$57.43. The trading volume registered during the day was 43,471,696 shares and the observed abnormal return was 13.55%.

The Wall Street Journal reported **(NM)** on March 13, 2000 about the instant messaging service offered by AOL called Buddy List. The article also commented on how instant messages were making inroads into corporate call centers and customer support operations. It was also commented about the competitive advantages that AOL had over its competitors in the field mentioned. On this day AOL's stock price increased by 3.81% from the previous day to a price of \$61.25.

The trading volume registered for the day was 30,246,896 shares, and the observed abnormal return was 3.144%.

On May 15, 2000 it was reported **(NM)** on Internet World how AOL exemplified the wireless and broadband revolution. On this day AOL stock price increased by 6.10% from the previous day to \$58.625. The trading volume registered for the day was 12,996,699 shares and the observed abnormal return during the day was 3.72%.

The Wall Street Journal reported **(NM)** on August 24, 2000 on a strategic alliance formed by AOL, Adero Inc. and Inktomi Corp. to install Adero's traffic monitoring software on servers throughout the Internet. On this day AOL's stock price increased by 3.45% from the previous day to \$59.875. The trading volume for the day was 11,018,599 shares and the observed abnormal return was .09%.

On November 6, 2000 Wireless Week reported **(NM)** on the potential role of instant messaging (IM) in businesses and the predicted increase of IM users by 2004. On this day AOL's share price increased by 4.58% from the previous day to \$55.86. The trading volume registered for the day was 13,266,500 shares and the observed abnormal return was 2.77%.

On November 21, 2000 the Wall Street Journal reported **(NM)** on a deal signed by Time Warner and Earthlink, an Internet provider, that would allow Earthlink to offer its services on Time Warners high speed cable system. On this day AOL's stock price decreased by 8.68% from the previous day to \$43. The trading volume registered for the day was 16,425,400 shares and the abnormal return observed on the day was -8.88%.

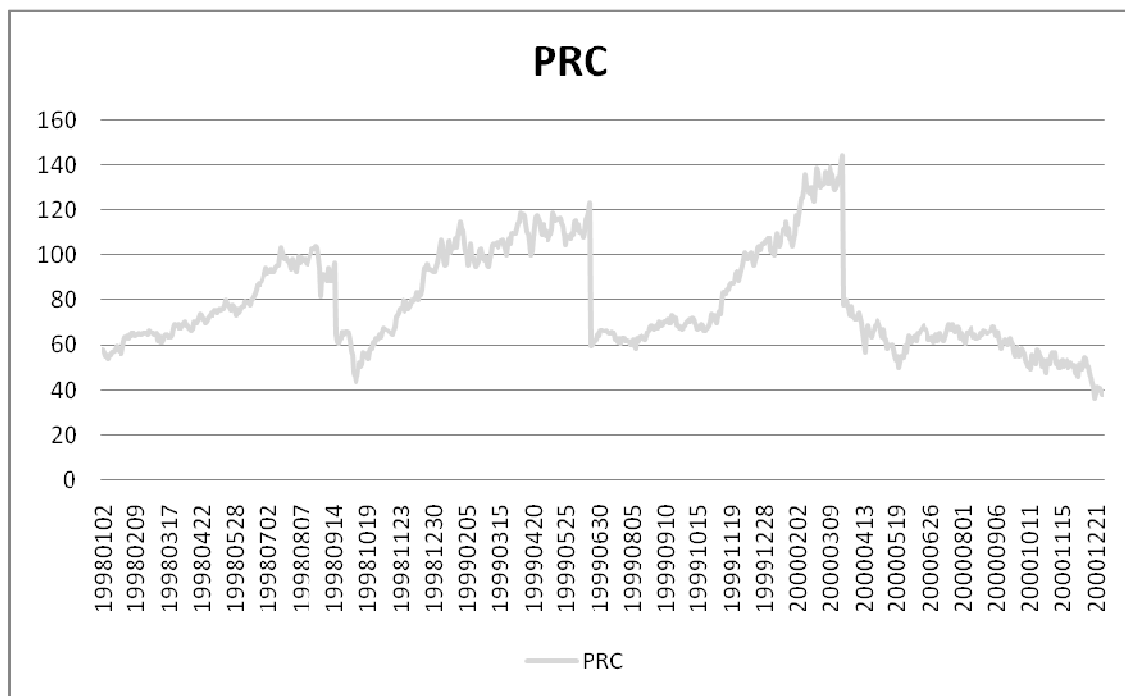
This news might have come as a surprise to AOL's investors, since a merger was being discussed at the time between AOL and Time Warner, so it was a mixed signal when Time Warner decided to allow a AOL competitor to use its resources. The investor acted accordingly, losing some trust on the strength of AOL share price, and selling the stock. On December 14, 2000 The Wall Street Journal reported that AOL and Time Warner had signed an agreement with the United States Federal Trade Commission under which the two companies committed to provide cable access to other Internet companies, this helped to bring the possible merger between the two companies a little closer. On this day AOL's stock price increased by 3.19% from the previous day to \$50. The trading volume registered for the day was 16,798,400 shares and the abnormal return observed during the day was 3.23%.

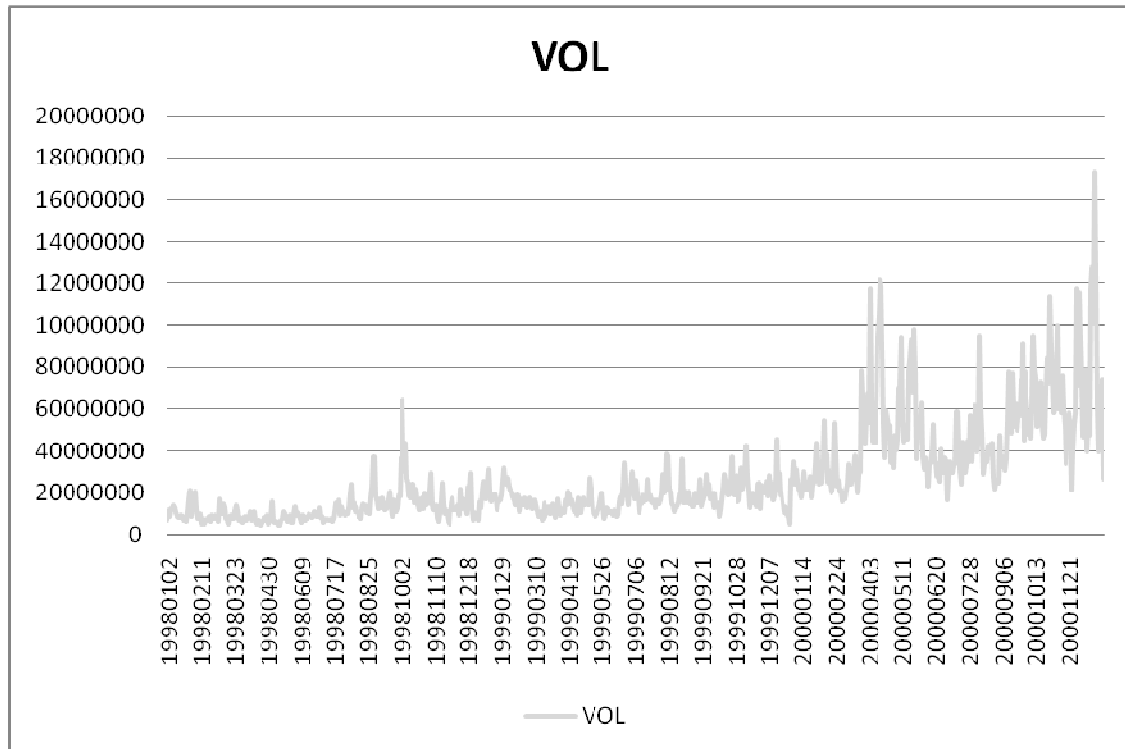
Cisco Systems (CSCO)

Cisco Systems, company ticker CSCO, was the world leader, during the period studied, in the creation of system networks for the Internet. These networks created by Cisco helped connect individual computers to other networks of computers. This helped users to access or transfer information without time constraints, place of access, or the type of computer being used²⁶. Cisco also provides a wide array of product utilized in the creation of information access networks. Cisco products can be customized to each client's needs and are sold

²⁶ Source Cisco Fact Sheet at www.Cisco.com

in 115 countries. The company's income has risen from \$69 million in 1990 to \$2.66 billion at the end of 2000. In the trimester ended December 1999 Cisco's income was \$796 million. During the period studied the company stock price registered a low of \$36.50 (Dec. 20, 2000) and the highest price observed during the same period was \$144.375 (Mar. 22, 2000). The highest level of trading volume for Cisco's stock observed during the studied period was 1,730 million shares (Dec. 20, 2000) and the lowest level of trading volume registered for the same period was 4,783,215 shares (Apr. 22, 1998). The average daily trading volume for Cisco's stock during this period was 26,733,876.





The company stock had a beta of 1.29804 for the year 1998, a beta of 1.29288 for the year 1999 and a beta of 0.8957 for the year 2000. The stock market capitalization for Cisco's shares during this period was \$273.02 billion and the company had 7.138 billion shares outstanding. The book value of the company stock was \$2.40 and the P/E ratio during the period studied was 347.72. Cisco had total assets at the end of the year 2000 of \$32.870 billion and total sales of \$2.210 billion. The company achieved a return on assets (ROA) of 2.42% for the quarter ended on December 2000, a return on equity (ROE) of 3.00% and (EPS) of \$0.11 for the same period. The financial figures for Cisco for the year ended December 30, 2000 were as follows, Expenses of \$7.283 billion, total sales of \$18.928 billion, pretax income of \$4.343 billion, and net income of \$2.668 billion, the year end ROA was 8.11% and the year end ROE was 10.06%. During the

period studied the company stock had a “Buy’ recommendation from JP Morgan. Let’s see Cisco’s stock price movement, as well as the changes in return and volume during the period of January 2 1998 to December 30 2000.

On February 1, 1999 it was reported **(RD)** in Fortune magazine that Cisco was expected to increase its sales by integrating its products to everyday home appliances like televisions and microwave ovens. Cisco’s share price increased to \$115, the trading volume for the day was 26,068,485 shares and the abnormal return observed during the day was 3.14%.

On February 9, 1999 different news sources reported **(RD)** that Cisco and Motorola would join forces to develop and launch wireless access to the Internet. On this day Cisco’s stock suffered a decrease in price to \$95.9375, the trading volume for the day was 21,406,555 and the abnormal return observed was - .4458%.

The decline in price might have been caused by the fact that in order to make this venture happen Cisco would have to invest \$1 billion. Probably the investors did not perceive it was the appropriate moment to make such a large disbursement. The New York Times reported **(NF)** on June 30, 1999 that Cisco was intending to buy \$435 million in shares of StratumOne Communications, a semiconductor technology developer. Cisco’s intention was to utilize StratumOne’s technologies in order to develop a new generation of high velocity computer networks. Cisco’s share price increased to \$64.4375 during the day, and registered a trading volume of 30,116,422. The abnormal return observed during the day was 1.18%.

On January 24, 2000 Interactive Week reported **(NM)** on the pressure by Cisco Systems to small vendors of virtual private networks and the views from different small vendors. On this date Cisco's stock price decreased by 5.369% to \$109.0625. The trading volume for the day was 22,302,406 shares and the observed abnormal return was -5.498.

PC Week reported on January 31, 2000 that Cisco Systems and Novell Inc. were developing **(RD)** and planning to release directory enabled networking hardware configuration and management applications. This gave consumer the advantage of managing their data more efficiently. On this date Cisco's share price increased by 5.41% from the previous day to \$109.50. The trading volume registered for the day was 34,083,296 shares and the observed abnormal return was 5.31%.

On April 3, 2000 Electronic Week reported **(NF)** about two acquisitions made by Cisco. On this date the company stock price decreased by 5.65% from the previous day to \$72.9375. The trading volume registered for the day was 62,668,909 shares and the observed abnormal return was -5.59%.

On May 8, 2000 eWeek reported **(NF)** on Cisco's intentions to acquire Internet company Arrowpoint Communications for an undisclosed amount. On this date Cisco's stock price decreased by 7.38% from the previous day to \$62.75. The registered trading volume for the day was 69,894,927 shares and the observed abnormal return was -7.47%.

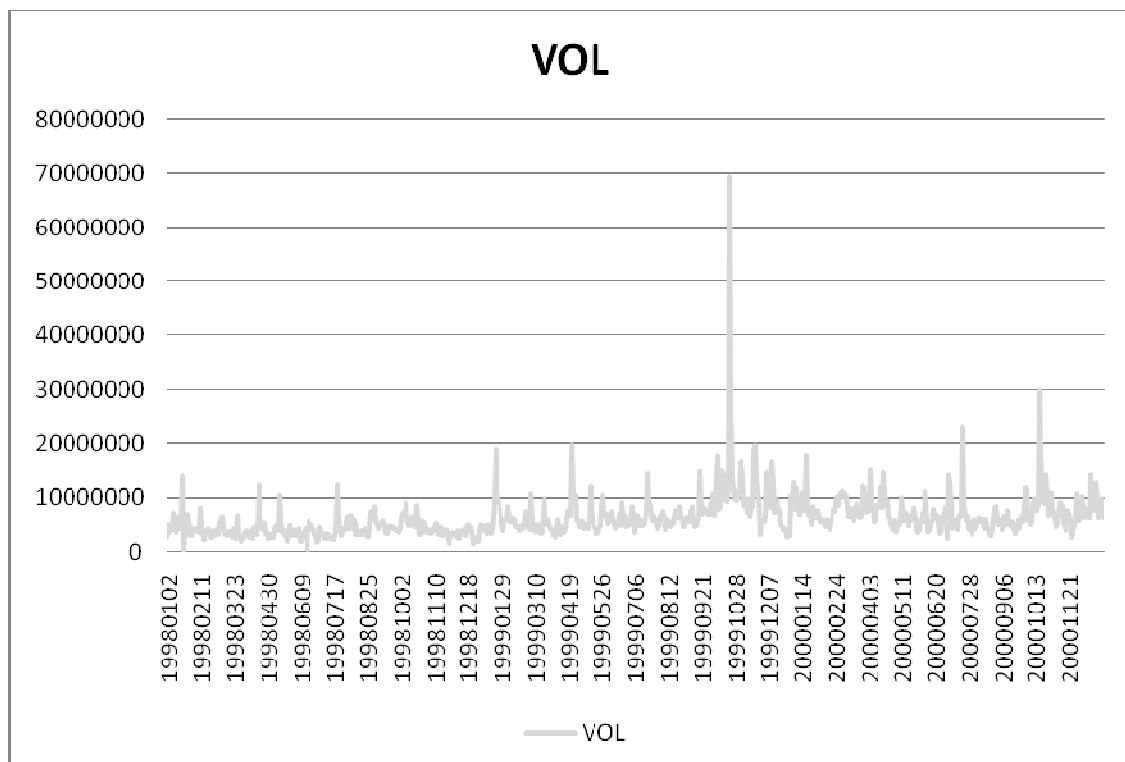
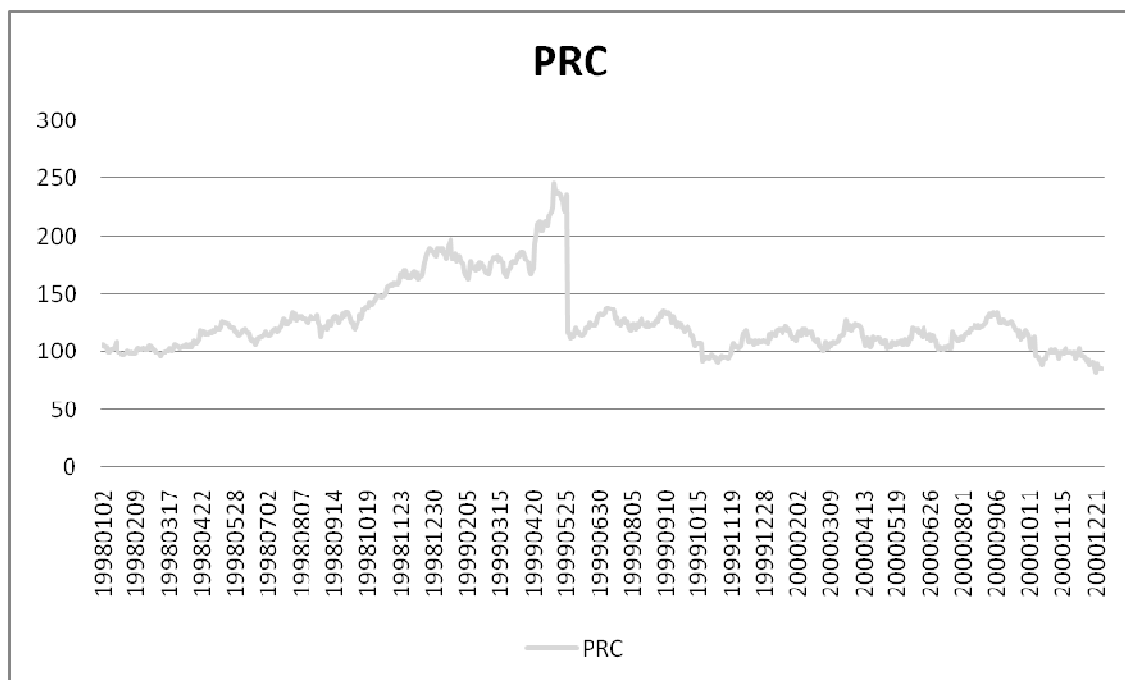
Interactive Week reported **(NF)** on July 31, 2000 on the list of company rankings regarding their earnings for the first quarter of the year 2000. It was reported that

Cisco was among the leaders in the rankings. On this date the company stock price increased by 4.17% from the previous day to \$65.4375. The trading volume registered for the day was 51,642,280 shares and the observed abnormal return was 3.96%.

On December 11, 2000 it was reported **(NF)** in Interactive Week about a rumored merger between Ciena and Cisco Systems. On this date the company stock price increased by 4.65% from the previous day to \$54.8125. The trading volume registered for the day was 79,357,851 shares and the observed abnormal return was 4.39%.

International Business Machines (IBM)

International Business Machines, company stock ticker IBM, provides high technology solutions, systems, products, services, computer programs and financing to its clients through the use of advanced information technology. For the trimester ended on December 2000 the company's net income was \$2.67 billion. This was as a result of an increase in the sale of personal computers, an increased in its customer base and revenue of \$1.61 billion in the sale of IBM Global Network to AT&T. The highest registered stock price during the period studied was \$246 (May 13, 1999) and the lowest observed price during the same period was \$81.5625 (Dec. 21, 2000). The average daily trading volume for IBM's stock during the period studies was 6,159,548. The lowest level of trading volume for the same period was 65,835 (Jan. 22, 1998) and the highest level of trading volume observed was 69,444,784 (Oct. 21, 1999).



IBM's had a stock market capitalization of \$148.146 billion and had 1.742 billion shares outstanding. The stock's book value was \$10.34 and the P/E ratio was 55.92. IBM had total assets of \$88.349 billion at the end of the year 2000, as well as total sales of \$25.616 billion. The return on assets (ROA) for the company was 3.02% for the quarter ended on December 2000, the return on equity (ROE) was 13.10% and (EPS) was \$1.48 during the same period. For the year ended December 30, 2000 IBM's financials were as follows, expenditures totaling \$22.9 billion, total sales of \$88.396 billion, pretax income of \$11.534 billion, and net income of \$8.093 billion. The ROA and ROE for the same period were 9.16% and 39.7% respectively. IBM stock presented a high trading volume during the period studied, but it is not considered a speculative stock. Even though the company is a high technology firm, it has already reached a business maturity state this makes the company stock unattractive for speculative investors, since the revenue margin is not as large as other less mature Internet companies. IBM is also one of the "Blue Chips"²⁷ that make up the Dow Jones Industrial Index, it is considered a stable company, and therefore no drastic price changes are expected. The P/E ratio for IBM's stock was 22.19 during this period which is not large when compared to the other companies analyzed in this study. IBM's stock beta for the year 1998 was 0.86276, for the year 1999 the beta was 0.8907 and for the year 2000 the company stock beta was 0.48644. It is interesting to mention that IBM's stock had been given a "Neutral" recommendation by

²⁷ Blue Chips is the name given to the companies that make up the Dow Jones Index, these companies are large and their stock prices are stable.

Prudential and Merrill Lynch. Let's take a look at the company's stock price movement, return and volume changes during the period studied.

On April 26, 1999, The Wall Street Journal published an article **(NF)** in which it was reported that IBM's income had increased by 42%. This increase in income was mainly due to an increase in sales. The company's revenue was \$1 billion over previous expectations. IBM's stock price increased to \$209.875, and the trading volume during the day was 9,333,000. The abnormal return observed during the day was 4.46%.

The New York Times reported **(NF)** on June 7, 1999 that IBM had received a contract from Acer Group for their services, for a total amount of \$8 billion. On this day IBM's share price increased by 3.8% to \$120.50. The trading volume registered for the day was 6,663,899 shares, and the abnormal return observed was 3.08%.

On June 21, 1999 The Wall Street Journal reported **(RD)** that Charles Schwab and IBM would develop together a new system to be used by Schwas to manage more efficiently stock transaction and sales volumes. During that day IBM's share price increased by 3.31% to \$124.75. The trading volume during the day was 6,466,299 shares and the abnormal return observed was 2.745%.

On August 11 the Wall Street Journal reported **(NM)** that IBM was planning to launch an Internet based travel agency. The plan was to create a virtual platform where airline companies could market and sell their products. On this date IBM's stock price increased by 3.3% to \$123.3125 and the trading volume registered

for the day was 5,543,000. The abnormal return observed during the day was 2.41%.

The New York Times published an article **(NF)** on October 21, 1999 that IBM was planning to stop selling their personal computers in conventional computer stores, and would only offer their Aptiva personal computers through the Internet. IBM's share price decreased by 14.95% from the previous day to \$91. The trading volume for the day was a very high 69,444,784 shares, and the abnormal return during this date was -14.796%.

The news had a very big impact on investor trading behavior, judging by the high trading volume. IBM's sale of personal computers at the time totaled \$2 billion, and apparently investors were concerned that IBM's revenue would be affected by the decision. On January 3, 2000 PC Week reported **(NF)** on the reorganization of IBM software divisions. The article also reviewed the move of IBM networking and Java lines into different divisions and the creation of Solutions and Integration unit. On this day the company stock price increased by 7.18% from the previous day to \$115.625. The trading volume registered for the day was 10,346,799 shares and the observed abnormal return was 6.88%.

PC Week reported **(NM)** on March 27, 2000 about IBM's planned introduction of its midrange F80, H80 and M80 RS/6000 servers that contain its Pulsar copper chips. The article also reported on the features of the products and the enhanced capabilities provided. On this date IBM's shares increased by 4.42% from the previous day to \$126.875. The trading volume registered for the day was 11,862,899 shares and an observed abnormal return of 4.38%.

On April 17, 2000 an article was published **(NM)** by Interactive Week on which it was reported on the growing market for Internet server appliances. The article also commented on the Internet server appliances launched by Dell Computer and IBM, and the opportunities faced on this growing market. On this day IBM's share price increased by 6.54% to \$111.875. The trading volume registered for the day was 9,959,799 shares and the observed abnormal return was 6.85%.

On June 5, 2000 it was reported **(NM)** in Info World on the preparation of IBM to launch its e2open.com, a global Internet business to business exchange for the telecommunications and electronics industries. On this day IBM's company stock price increased by 3.688% from the previous day to \$112.437. The trading volume registered for the day was 7, 281,299 shares and the observed abnormal return for the day was 3.14%.

The Wall Street Journal reported **(NF)** on July 20, 2000 that IBM had beaten the earnings forecast set by the market despite a 19% drop in profits. On this day IBM, stock price increased by 13.043% from the previous day and the trading volume registered for the day was 22,927,888 shares. The observed abnormal return was 12.65%.

Apparently the investors gave a lot of weight to the fact that IBM had beaten market expectations even after experiencing a significant drop in profits. On October 18, 2000 the Wall Street Journal reported **(NF)** on the disappointing 3% revenue growth achieved by IBM during the third quarter of the year 2000. On this day IBM's stock price experienced a sharp decline of 15.54% from the

previous day, to a price of \$95.43. The trading volume registered for the day was 29,776,496 shares and the observed abnormal return was -15.15%.

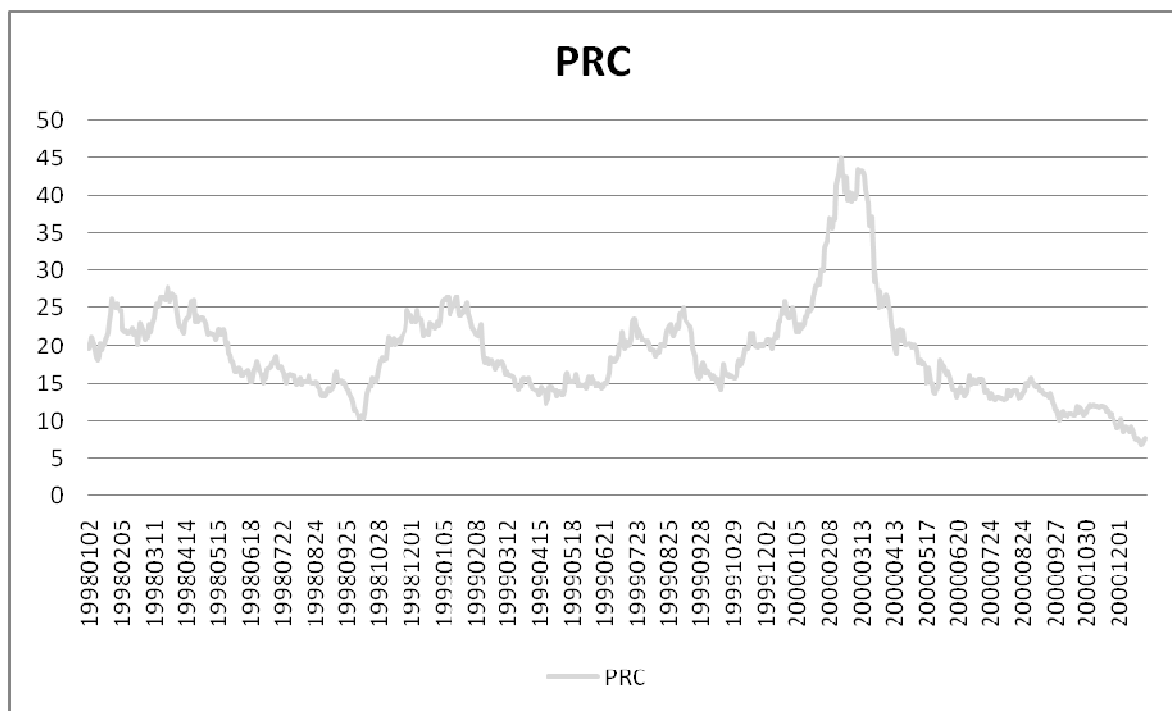
Even when IBM reported a growth in revenues for the third quarter of the year, investors perceived this increase as minimal, or at least less than what they expected. This reaction on the part of investors was made evident by their trading behavior during the day, selling IBM shares. On November 13, 2000 eWeek reported **(NM)** on Bank of America and Chase Manhattan Bank's partnership with IBM Corp. to form Viewpointe Archive Services, a check image archive company. The article also commented on the differences between Viewpointe's offerings from other check imaging companies. On this day IBM's stock price increased by 4.77% to \$97.437, the trading volume registered for the day was 8,684,899 shares and the abnormal return observed during the day was 5.23%.

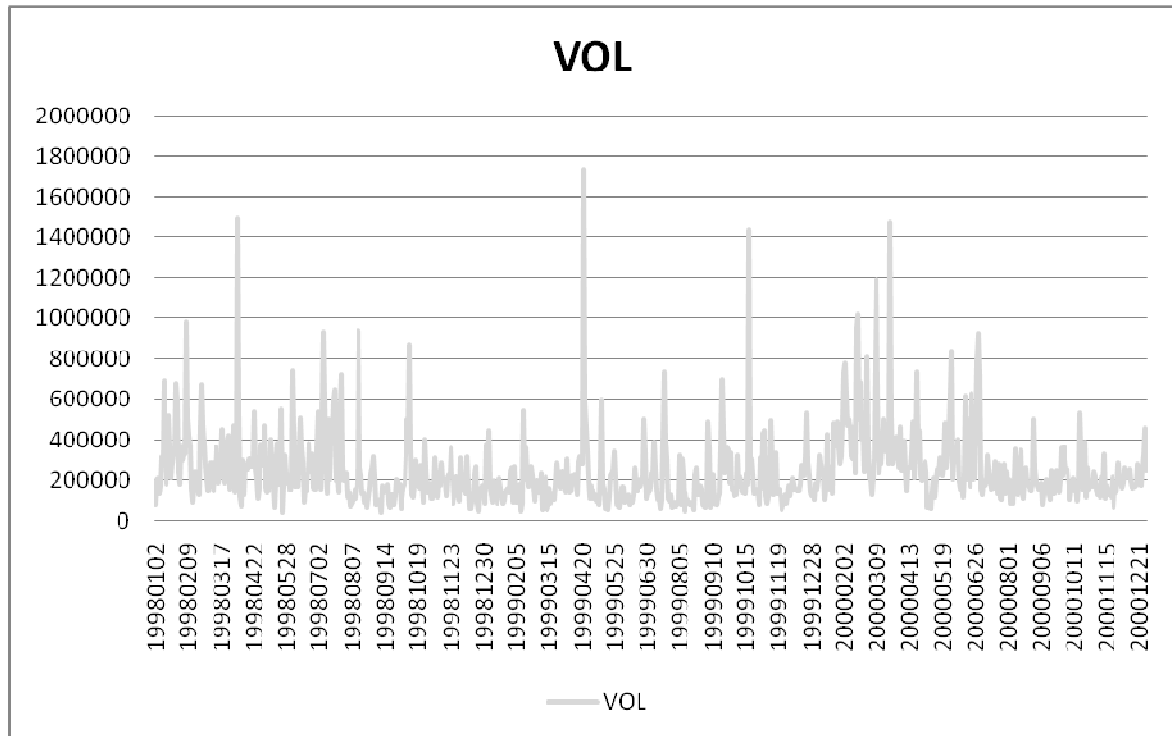
On December 18, 2000 Info World reported **(NM)** on IBM's plans to transform itself into a first-tier player in the on demand computer services market targeting utility companies, and the advantage of the company over its competitors. On this date IBM's stock price increased by 3.06% from the previous day to \$90.50. The registered trading volume for the day was 7,693,700 shares and the observed abnormal return was 3.38%.

Intel Corporation (INTC)

Intel Corporation, company stock ticker INTC, designs, manufactures and sells different personal computer components, and other products related to computer

integration. Intel's main products are computer semiconductors and processors. For the trimester ended on December 2000, the company's net income was \$2.193 billion. This was mainly due to a high sales volume of computer microprocessors and a reduction in production costs. The highest stock price observed during the period studied was \$44.90 (Feb. 22, 2000) and the lowest stock price during the same period was \$6.781 (Dec. 26, 2000). The average daily trading volume for Intel's stock during this period was 247,061. The highest level of trading volume observed was 1,734,771 (Apr. 22, 1999) and the lowest level of trading volume registered during the same period was 39,973 (May 22, 1998).





The company had a stock beta of 1.39833 in the year 1998, in the year 1999 the company's stock had a beta of 1.14683, and in the year 2000 the beta was 0.63344. Intel's stock market capitalization for this period studied was \$51.667 billion, and the highest market capitalization observed between 1998 and the year 2000 was \$149.696 billion. At the end of the year 2000 the company had 3.31 billion stocks outstanding. The book value of the company stock was \$7.70 and it had a P/E ratio of 23.29 during the period studied. Intel had total assets of \$47.945 billion at the end of the fourth quarter of the year 2000 and total sales of \$8.702 billion, the company's return on assets (ROA) for the quarter ended on December 2000 was 4.57%, the return on equity (ROE) of 5.87% and the (EPS) was \$0.33 for the same period. The yearend numbers for the year ended on December 30, 2000 were: expenditures totaling \$8.986 billion, total sales of \$33.726 billion, pretax income of \$15.141 billion and net income of \$10.535

billion. The return on assets and return on equity for the same period were 21.97% and 28.22% respectively. Intel is also a well established company. Although it doesn't have the state of business maturity that IBM has, is a lot more solid than the majority of the tech-stocks being traded during the period studied. During this period Bank of America Securities and Solomon Smith Barney had given the company's stock a "Buy" recommendation. Let's see the impact news had over the company's stock price, return and volume.

On January 22, 1999 the New York Times reported **(NF)** that Intel was going to acquire \$100 million in Samsung's corporate bonds. The bonds were convertible to roughly 1% of Samsung's company stocks. On this day Intel's stock price decreased from \$25.125 to \$24. The trading volume for the day was 116,019 and the abnormal return observed was -4.389%.

On April 6, 1999 it was reported **(RD)** in USA Today that Intel was testing a new direct sales system to be applied on their web site. On this day Intel's share price decreased by 4.54% to \$15.09. The trading volume for the day was 163,492 and the abnormal return observed was -4.082%.

On April 16, 1999 different sources reported **(NF)** that Intel's income had increased by 57% and the company revenue had increased by 18%, this was due to the successful sales level attained by their microchip processor Pentium III. The share price on that day increased by 8.33% to \$14.625. The trading volume for the day was 291,172, and the abnormal return observed was 6.90%.

The New York Times reported **(NF)** on May 7, 1999, that Intel had acquired \$15 million in Silicon Valley Group stocks. On this day Intel's share price decreased

by 3.16% to \$13.375. The trading volume registered for the day was 105,517, and the abnormal return observed was -3.79%.

On January 24, 2000 Electronic News reported **(RD)** on the effort of a group led by Intel Corp. to develop dynamic access memory technology, and the impact this technology could have in the markets. On this day Intel's stock price increased by 5.50% from the previous day to \$26.37. The trading volume registered for the day was 483,270 shares and the abnormal return observed was 5.60%.

PC Week reported **(NM)** on January 31, 2000 that Intel Corp. was ready to release computer hardware and software products designed to make it easier for server and workstation makers to add RAID computer networks to their products. The article also commented on the advantages to be offered by such products. On this date Intel's stock price increased by 6.43% to \$30. The trading volume registered for the day was 277,531 shares and the observed abnormal return was 6.71%.

On February 14, 2000 Electronic News reported **(RD)** on the faster microprocessors developed by AMD and Intel Corp, as well as the success on the part of Intel in conditioning users about the benefits of higher processor speed. On this day Intel's share price increased by 3.68% from the previous day to \$36.93. The trading volume registered for the day was 463,466 shares and the observed abnormal return was 3.16%.

On April 10, 2000 Electronic News reported **(NF)** on the acquisition of software development tool maker Kuck and Associates by Intel Corp. On this day Intel's

stock price decreased by 4.53%, the trading volume registered during the day was 254,039 shares and the observed abnormal return during the day was -3.518.

Electronic News reported **(NM)** on April 24, 2000 on the efforts of Intel to address the shortage of Pentium III microprocessors and the opportunity that this presented for Advanced Micro Devices, Intel's closest competitor. On this day Intel's stock price decreased by 7.60% from the previous day to a price of \$20.50. The trading volume registered for the day was 738,040 shares and the observed abnormal return was -6.55%.

On July 3, 2000 Electronic News reported **(NM)** on the advantages Advanced Micro Device Inc. (AMD) AMD Duron chip had over Intel's Celeron chip in the competition for the personal computer sub market. On this day Intel's stock price decreased by 5.05% from the previous day to a price of \$15.25. The trading volume registered for the day was 156,809 shares and the observed abnormal return was 5.689%.

On July 10, 2000 eWeek reported **(NM)** that some of the largest computer makers had forced Intel to halt plans to release a high end Pentium III Xeon processor, since the chip did not provide enough of a performance gain to warrant an update. On this day Intel's stock price decreased by 3.20% from the previous day to \$15.125. The trading volume for the day was 194,788 shares and the observed abnormal return was -3.398%.

On October 2, 2000 eWeek reported **(NM)** on the decision by Intel to halt production of its Timna processor. On this date Intel's stock price decreased by

10.98% from the previous day to a price of \$10.125. The trading volume registered during the day was 369,005 shares and the observed abnormal return was -10.29%.

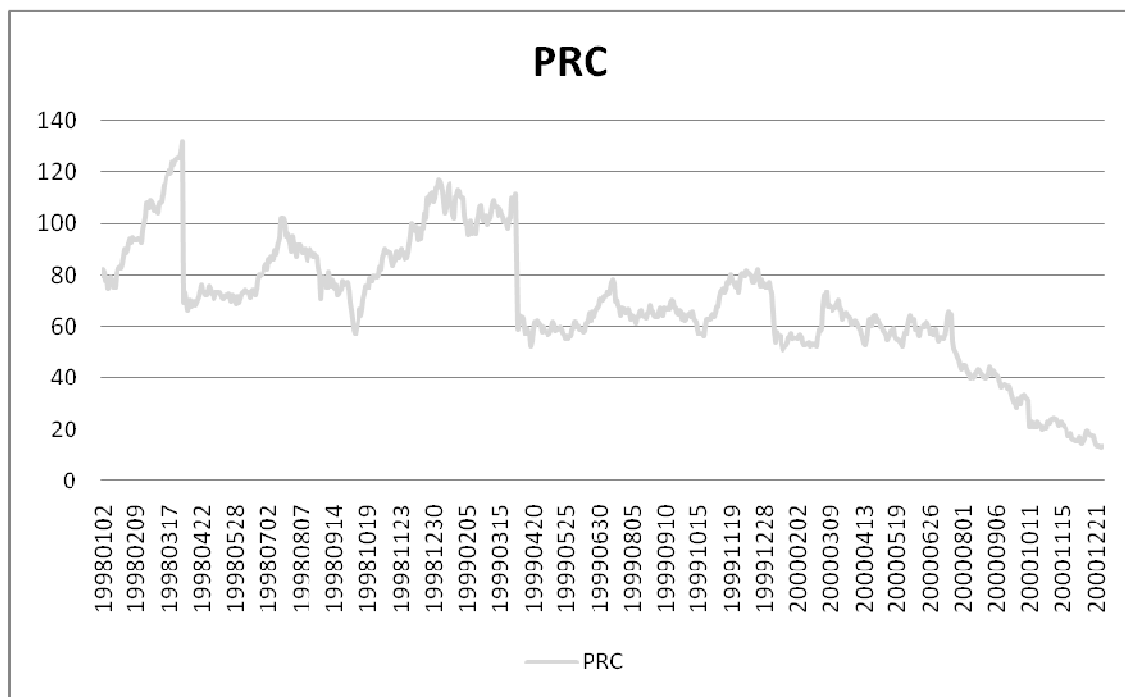
On October 23, 2000 Electronic News reported **(NM)** on Intel's disappointment with the alliance formed with Rambus Inc., the problems that Intel's engineers were facing and the complaints about Rambus technology. On this day Intel's stock price decreased by -7.29% from the previous day to \$11.25. The trading volume registered for the day was 147,973 shares and the observed abnormal return was -7.73%.

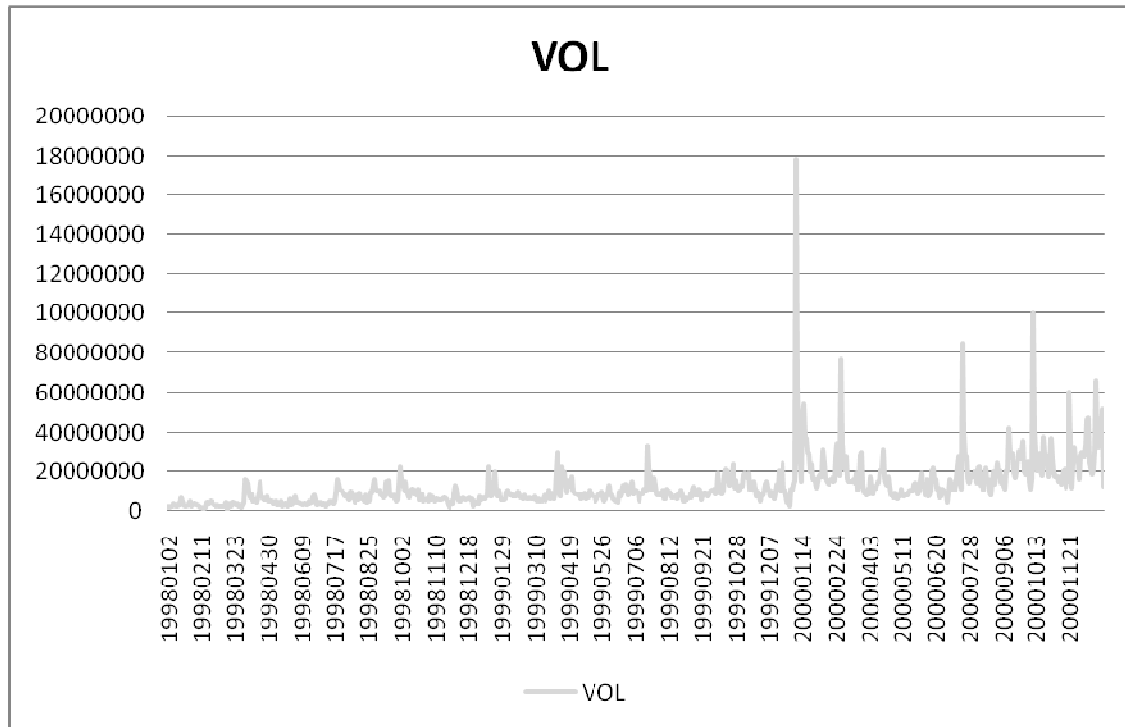
Electronic News reported **(NM)** on December 18, 2000 on the possible competition between Intel Corp. and Sun Microsystems in the market for personal computer microprocessors. On this day Intel's stock price decreased by 6.27% from the previous day to \$8.40. The trading volume registered for the day was 168,614 shares and observed abnormal return was -5.70%.

Lucent Technologies (LU)

Lucent Technologies designs, develops, manufactures and provides systems and computer programs internationally. These systems and computer programs help network operators and other Internet service providers to have and offer Internet access via cable or wireless. For the trimester ended on December 30, 2000 the company net income (loss) was (\$484). Sales for Lucent were \$7.172 billion, mainly due to an increase in sales of its computer program "System for Network Operators" one of the company's most demanded and successful

product. The highest share price observed during the studied period was \$132.125 (Apr. 1, 1998) and the lowest share price registered during the same period was \$13.125 (Dec. 28, 2000). The average daily trading volume for Lucent's stock was 12,464,879. The highest level of trading volume during the period studied was 178.6 million shares and the lowest trading volume for the same period was 592,700 shares.





The stock market capitalization for Lucent's shares was \$45.688 billion, the highest market capitalization observed for the company during the period studied was \$86.556 billion. The company had 3.384 billion stocks outstanding at the end of the year 2000. Lucent's stock had a beta of 1.56968 for the year 1998, a beta of 1.182399 for the year 1999 and a beta of 1.36423 for the year 2000. The company book value for its shares was \$4.07 and its P/E ratio was 96.42. Lucent had total assets at the end of the year 2000 of \$48.792 billion, total sales of \$7.172 billion, the return on assets for the company was (.090%) and the return on equity was (1.84%) and the (EPS) was (\$0.14) for the same period. The financial figures for the year ended on December 30, 2000 were: expenditures \$8.728 billion, total sales of \$28.904 billion, pretax income of \$2.357 billion, and net income of \$1.219 billion, the company's ROA and ROE for the same period

were 2.49% and 4.66% respectively. The investment firm Lehman Brothers and AG Edwards had given the company's stock a "Buy" recommendation during the period studied. The movement of the stocks volume, price and returns given different news was as follows.

On September 8, 1998 it was reported **(RD)** in different news sources that Lucent had developed a new technology that could increase a wireless network capacity between 10-20 times. On the day of the announcement Lucent's stock price increased to \$81.50, the trading volume for the day was 10,878,700 and the abnormal return observed during the day was 3.67%.

On December 21, 1998 it was reported **(NF)** on the Wall Street Journal that Motorola, a company mainly dedicated to the production of cellular phones, was planning on buying Lucent's division dedicated to the development of cellular phones. Analysts estimated that Motorola would pay around \$150 million to Lucent. On that day Lucent's stock price increased to \$103.875, the trading volume registered during the day was 7,015,300 and the abnormal return observed was 5.21%.

As mentioned before it is usual that the price of the stock of a company being acquired increases in price, this appears to be the case in this example. On January 13, 1999 it was reported **(NF)** in the Wall Street Journal that Lucent was planning to acquire Kenan Systems for \$1.5 billion. The company used to produce and develop billing software. On this day Lucent's stock price decreased from \$107.875 to \$104.25, the trading volume observed during the day was 22,850,000 shares and the abnormal return observed was -2.37%

In this case the trading volume for the day increased by nearly 15,000,000 shares from the previous day. Apparently investors did not see the investment as very beneficial to Lucent's future. On July 26, 1999 Computer Reseller News reported **(NF)** that Lucent had acquired Nexabit for \$900 million. Lucent's stock price decreased to \$64.625, the trading volume for the day was 15,300,699 shares and the abnormal return observed was -2.20%.

On October 26, 1999 the Wall Street Journal reported **(RD)** that Lucent had signed a treaty with Empresa Brasileira de Telecomunicacoes to develop and build a multiservice network in Brazil. Lucent's share price increased during this day from \$59.875 to \$62.875, the trading volume registered during the day was 24,152,592 shares, more than 6,000,000 shares over the previous trading volume. The abnormal return registered during this day was 4.82%.

Electronic News reported **(NM)** on January 10, 2000 the selling of Wildwire ADSL modem chip to Hewlett-Packard Co. by Lucent, to be used in the Pavilion consumer microcomputers. On this day Lucent's stock price increased by 7.67% from the previous day to \$57.875. the trading volume for the day was 62,328,896 shares and the observed abnormal return was 5.34%.

Info World reported **(RD)** on April 17, 2000 about the plan of Lucent Technologies and TeraBeam networks to develop and deploy TeraBeam's wireless service. On this day Lucent's share price increased by 3.56% from the previous day to \$54.50, the trading volume registered during the day was 20,027,392 shares and the abnormal return observed was 4.611%.

On October 16, 2000 it was reported **(NF)** in Wireless Week about the profit warnings for the third quarter issued by Lucent, the decline of operating earnings by the company and the impact these news could have on the company stock. On this day the company share price decreased by 4.30% to \$22.25. The trading volume registered for the day was 20,629,488 shares and the observed abnormal return was -4.83%.

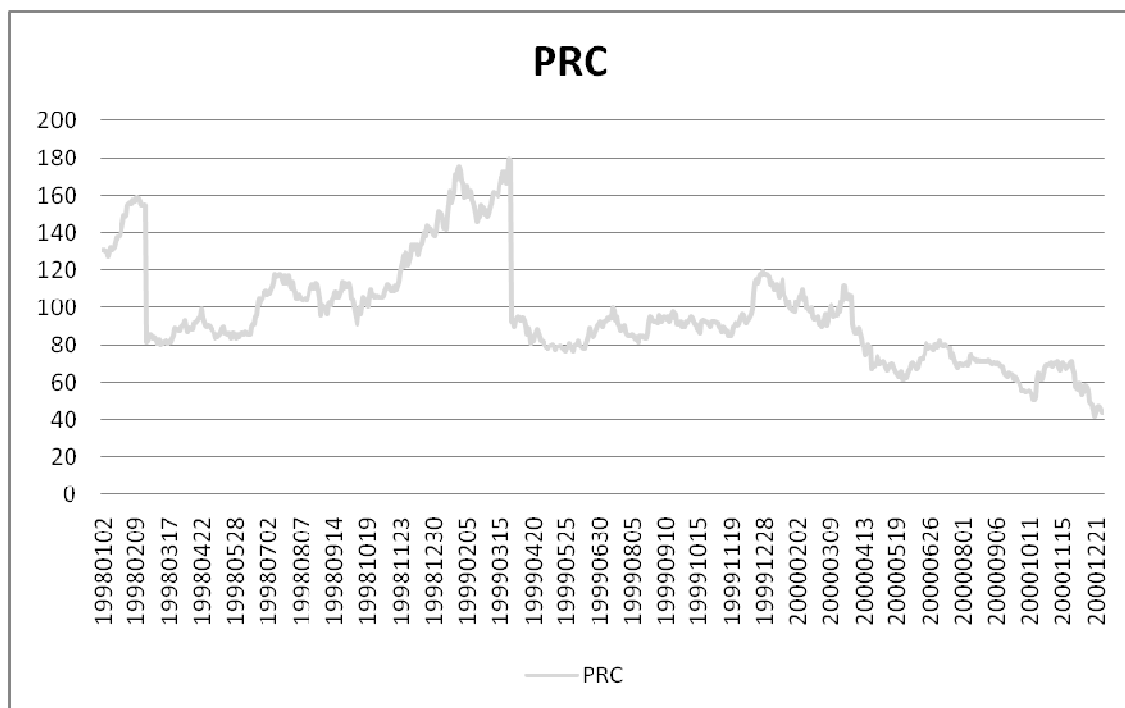
Electronic News reported **(HR)** on November 13, 2000 that Lucent had fired an undisclosed amount of employees. On this date Lucent's stock price increased by 45 from the previous day to \$22.75. The trading volume registered for the day was 18,546,192 shares and the observed abnormal return was 5.48%.

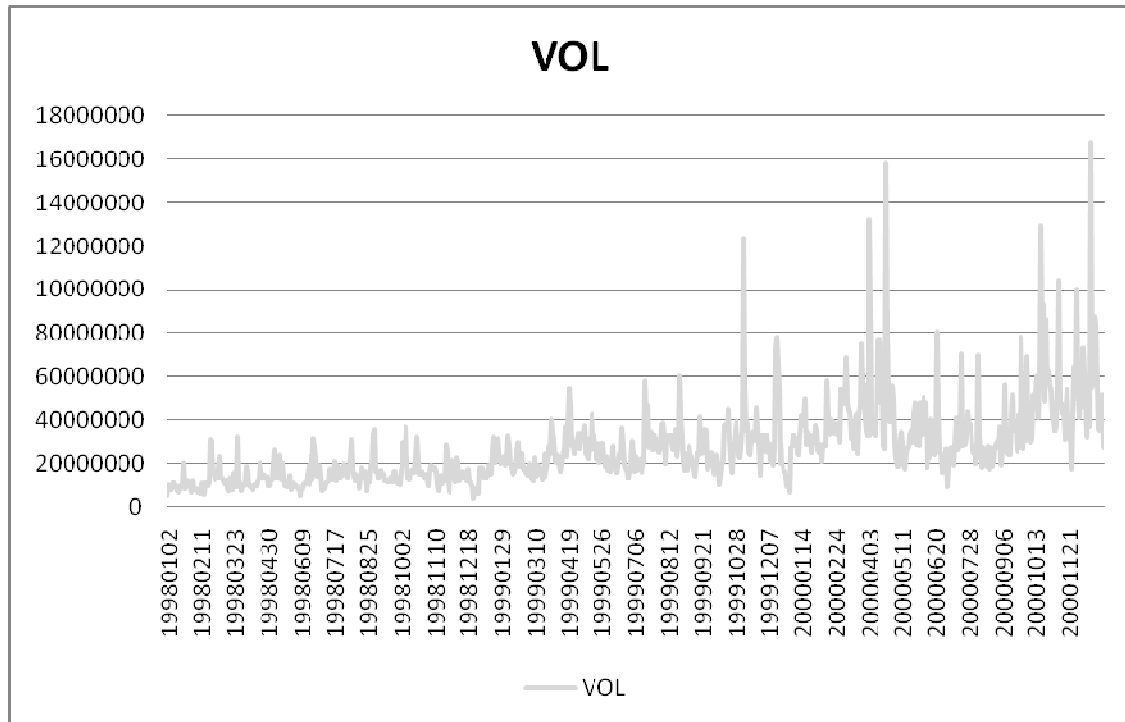
On December 11, 2000 Electronic News reported **(RD)** on the letter of intent signed by AT&T Wireless Services, Ericsson, Lucent, Nokia, and Nortel Networks to develop and install the first third generation wireless infrastructure in the United States. On this day Lucent's share price increased by 8.09% from the previous day to \$16.6875. The trading volume registered for the day was 33,169,700 and the observed abnormal return was 6.20%.

Microsoft Corporation (MSFT)

Microsoft Corporation, company stock ticker MSFT, develops and manufactures a wide array of computer software and products. They are the creators of Windows and all the applications of its operating system. For the trimester ended on December 30 2000, Microsoft's net income was \$2.409 billion. This was as a result of an expected increase in the sales of Windows Office. The highest share

price registered during the period studied was \$179.9375 (Mar. 25, 1999) and the lowest stock price observed for the same period was \$41.50 (Dec 20, 2000). The average daily trading volume during the period studied was 26,966,079 million shares. The highest level of trading volume registered for Microsoft's shares during the period studied was 167,728,713 million shares (Dec. 15, 2000) and the lowest level of trading volume for the same period was 3,648,487 shares (Dec. 24, 1998).





Microsoft had a stock beta of 1.01325 for the year 1998, a beta of 0.94086 for the year 1999 and a beta of 0.6547 for the year 2000. The market capitalization of Microsoft's shares was \$229.150 billion, the highest market capitalization between 1998 and the year 2000 was \$916.023 billion. The company had 5.283 billion outstanding shares and the company stock had a book value of \$5.37, at the end of the year 2000. The Price-Earnings ratio for the company was 94.29. Microsoft total assets at the end of the year 2000 were \$52.150 billion and total sales of \$5.804 billion. The company had a return on assets (ROA) of 4.62%, a return on equity (ROE) of 5.82% and (EPS) of \$0.44 for the same period. The total amounts for the year ended on December 30, 2000 were \$8.948 billion in expenditures, total sales of \$22.956 billion, pretax income of 414.275 billion and net income of \$9.421 billion. The ROA and ROE for the same period were 18.06% and 22.77% respectively. Even though Microsoft at the time of the study,

was a solid company financially, it left a lot of room for investors' speculation due to the legal problems Microsoft was facing at the time, as the company was being accused by the federal government of having a monopoly with its operating system, Windows. It seemed that many investors were buying the stock expecting the price to rise to higher levels once the legal problems were resolved. Microsoft's shares were given a "Strong Buy" recommendation by the investments firms SG Cowen and Prudential Securities. The changes of stock prices, returns and volume given specific company news were as follow.

On January 12, 1999 different news sources reported **(NF)** that Microsoft would buy 1.75 million shares from Banyan Systems, for \$10 million. Both companies would work together in the development of new software. Microsoft's share price decreased to \$142.1875, the trading volume for the day was 14,565,268 and the abnormal return observed was -3.224%.

On April 19, 1999 different news sources reported **(NF)** that Microsoft was planning to invest \$60 million in NorthPoint, an Internet access provider company. NorthPoint had businesses in 17 states in the U.S. Microsoft's share price decreased to \$81 during the day, the trading volume registered for this date was 38,429,941 shares. The abnormal return observed was -6.18%.

The Wall Street Journal reported **(NF)** on July 20, 1999 that Microsoft was planning to sell Sidewalk, a city map and city addresses provider on the Internet, to Ticket Master. On this date Microsoft's share price fell to \$93.3125, the trading volume registered for the day was 46,608,196 and the abnormal return observed during the day was -4.26%.

On September 23, 1999 different news sources announced **(NF)** the expected first public offering of Expedia.com, an Internet travel agent services provider. The expected revenue for Expedia was \$75 million annually. Microsoft at that time was the owner of 80% of Expedia's shares. On that day Microsoft's shares decreased to \$91.1875, and the trading volume for the stock was 35,720,412 shares. The abnormal return observed was -4.26%.

Other news sources reported a worry on the part of the investors as to what would be the effect on Microsoft's future if Expedia.com was not successful. This could be the cause for the decrease in price experienced by Microsoft's shares during this day. The Wall Street Journal reported **(NM)** on January 26, 2000 that Sun Microsystems was set to unveil its version of the server operating system Solaris 8. The article also commented on the expected favorable ruling by a United States District Court Judge in favor of Sun Microsystems on a lawsuit against Microsoft. On this day Microsoft's stock price decreased by 3.34% from the previous day to \$99.375. The trading volume registered for the day was 25,084,165 shares and the observed abnormal return was -3.795%.

On March 9, 2000 the Wall Street Journal reported **(NF)** on a contract that was awarded to Microsoft for their services from Mega Pixel Corp, the details of the deal were not disclosed. On this day, Microsoft' share price increased by 4.64% from the previous day to \$99.375. The trading volume registered for the day was 44,519,308 shares and the abnormal return observed was 3.58%.

On March 23, 2000 the Wall Street Journal reported **(RD)** that Thalia products division of Sunbeam Corp., a domestic appliance producer, was joining a

consortium led by Microsoft in order to develop standards so that small appliances could communicate with each other. On this day Microsoft's stock price increased by 8.35% from the previous day to a price of \$111.875. The trading volume registered for the day was 74,881,403 shares and the abnormal return observed during the day was 7.73%.

Fortune magazine reported **(NM)** on April 3, 2000 on the possible troubles Microsoft could face with the introduction of a videogame machine named X-box, and how the authors consider this is an act of weakness presented by Microsoft. On this day Microsoft's share price decreased by 14.47% from the previous day to \$90.875. The trading volume for the day was 132,327,594 shares and the observed abnormal return for the day was -13.125%.

The trading volume for the day was alarmingly high, probably indicating the discontent that investor had for Microsoft venturing into the gaming consoles industry. This industry had been dominated for year by companies like Nintendo and Sony (Playstation), and Microsoft had no experienced in this area of business, making the move to be perceived by investors as a high risk. On April 24, 2000 Info World reported **(NM)** on the accusations made by the Computer and Communications Industry Association (CCIA) of Microsoft for using its Windows 2000 product to dominate the server and computer network markets. On this day Microsoft's share price decreased by 15.59% from the previous day to a price of \$66.625. The trading volume for the day was 158,203,092 shares and the abnormal return observed during the day was -14.646%.

On May 2, 2000 the Wall Street Journal reported **(NM)** that the restrictions that the United States Government was seeking to impose on Microsoft could threaten a generation of the software company's Windows operating system. On this day Microsoft's share price decreased from \$73.4375 to \$69.875. The trading volume registered for the day was 49,455,459 shares and the observed abnormal return was -4.504%.

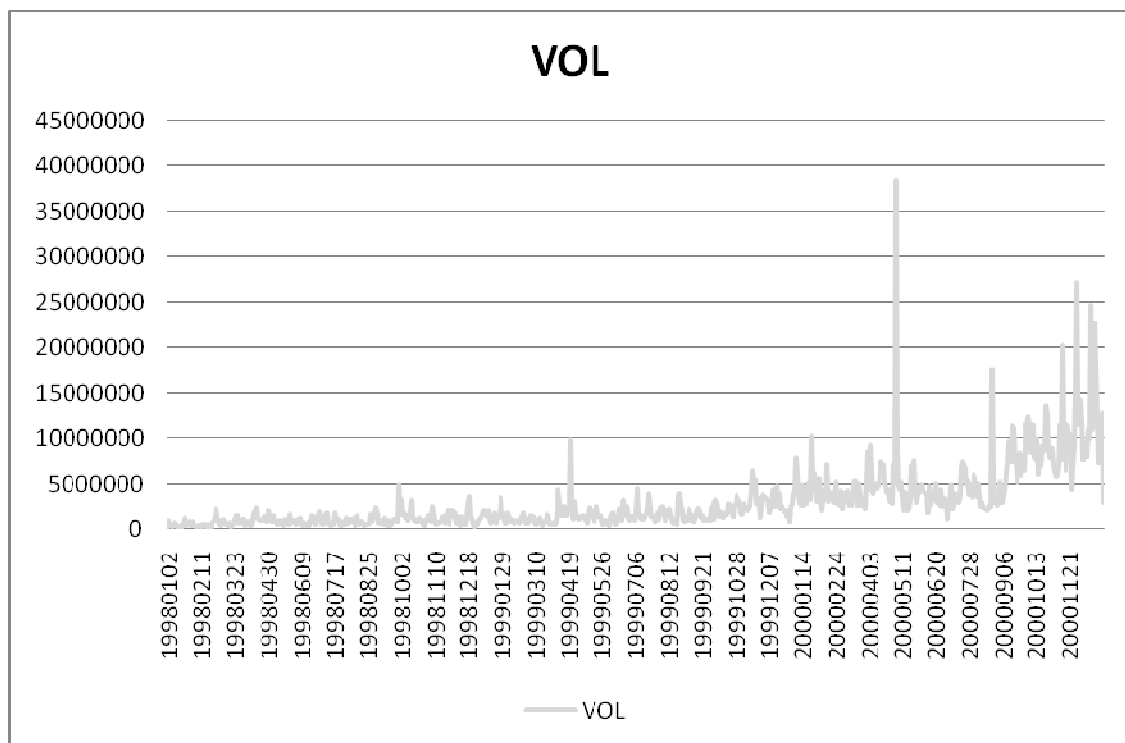
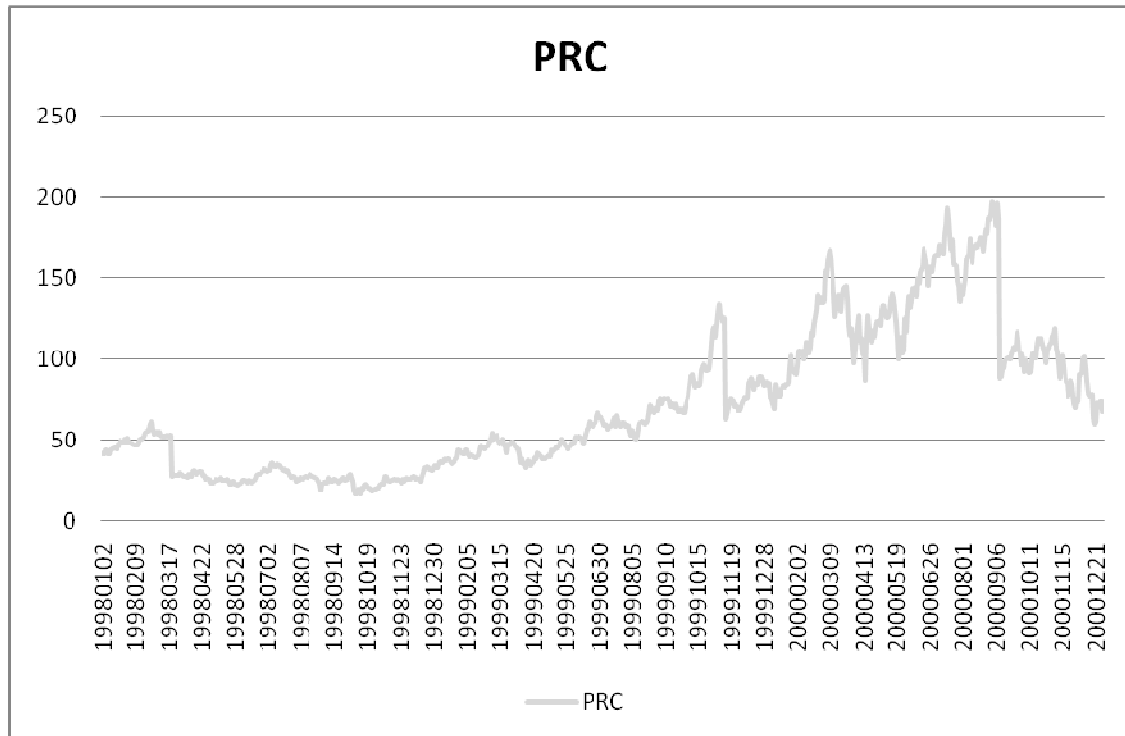
PC Magazine reported **(NM)** on June 6, 2000 as their gadget of the month, the Microsoft pocket PC hand held computer, and compared the product to the Palm line of personal digital assistants. On this day Microsoft's stock price increased by 4.11% from the previous day to \$69.625. The trading volume registered for the day was 50,216,509 shares and the observed abnormal return was 3.73%.

On October 20, 2000 the Wall Street Journal reported **(NF)** how Microsoft's positive financial numbers helped the recovery of the NASDAQ index in the United States. On this day Microsoft's share price increased by 5.35% from the previous day to \$65.1875. The trading volume for the day was 81,219,821 shares and the observed abnormal return was 4.27%.

Siebel Systems Inc. (SEBL)

Siebel Systems develops, designs and sells programming systems for marketing and information management. The company provides these products to businesses specialized in marketing, customer service, telemarketing, Internet marketing, and also provides consulting services on the areas mentioned before, to small businesses. Siebel has strategic alliances with IBM and Lucent

Technologies. Analyst contemplated the idea, during the period studied, that the strategic alliance with IBM could increase Siebel's sales by 20%. The company's stock was given a "Strong Buy" recommendation by Bank of America Securities and SG Cowen. For the trimester ended on December 30, 2000 the company's net income was \$79.484 million. The company attained this amount due to an increment in the program licenses sold to new customers. These increases also reflect that the company no longer had to pay \$13.5 million in costs related to a past merger. The stock price reached its highest level during the period studied of \$197.8125 on Aug. 31, 2000, a market capitalization at this time of \$83.325 billion, and its lowest share price during this period was \$16.5625 on Oct. 8, 1998. The company stock had an average daily trading volume of 2,948,330 shares. The highest level of trading volume observed during this period was 38,486,262 shares (Aug. 4, 2000) and the lowest level of trading volume registered during this period was 91,397 shares (Jan. 2, 1998).



The company stock beta for the year 1998 was 1.85499, the beta for the year 1999 was 1.50829 and for the year 2000 the company stock beta was 1.63075.

The market capitalization for Siebel's shares was \$29.16 billion and the company had 442.392 million shares outstanding at the end of the year 2000. The company stock book value was \$4.59 and its P/E ratio was 375.69. Siebel had total assets of \$2.161 billion, total sales of \$581.63 million, the return on assets for Siebel was 3.67%, the return on equity was 6.20% and the (EPS) was \$0.15 during the last quarter of the year 2000. The financial numbers for the year ended on December 30, 2000 were: expenditures of \$992.57 million, total sales of \$1.795 billion, pretax income of \$384.41 million, and net income of \$221.899 million. The ROA and ROE during the same period were 10.26% and 17.33% respectively.. Let's see the changes in stock price, return and volume for this company.

On March 9, 1998 it was reported **(NF)** on different news sources that Siebel would acquire Scopus technologies for 7.3 times the revenue Scopus generated. On this day the company's share price decreased by 4.318% from the previous day to \$52.625. The trading volume registered for the day was 873,495 shares and the observed abnormal return was -4.188%.

On September 25, 1998 different news sources reported **(NM)** that Siebel (Sebl) could face competition from SAP a German company dedicated to programming and software development directed towards point of sales activities. Officials from Sebl stated that SAP did not represent a direct threat to the company. That day, Sebl's stock price fell from \$26.375 to \$25.25, the trading volume registered was 904,913 shares and the abnormal return observed was -6.17%.

Information Week reported **(NF)** on December 14, 1998 that Sebl would unite their client service division with Sequent Computer Services. On this date Sebl's stock price decreased to \$25.5625, the registered trading volume for the day was 493,243 shares and the abnormal return observed was -1.08%.

On April 6, 1999 it was reported **(NF)** in Forbes magazine that the expenditures of technology and software companies had increased from \$320.9 billion to \$352.7 billion. Sebl was mentioned in the article. The company stock price decreased from \$44 to \$41.50, the trading volume registered for the day was 1,927,158 and the abnormal return observed was -5.30%.

On July 19, 1999 it was reported in Information Week **(NF)** that Great Plains software had hired Sebl to update all their marketing systems, client services and Internet sales services. On this day Sebl's stock price increased from \$61.3125 to \$63.50, the trading volume registered during the day was 1,598,938 and the abnormal return observed was 3.34%.

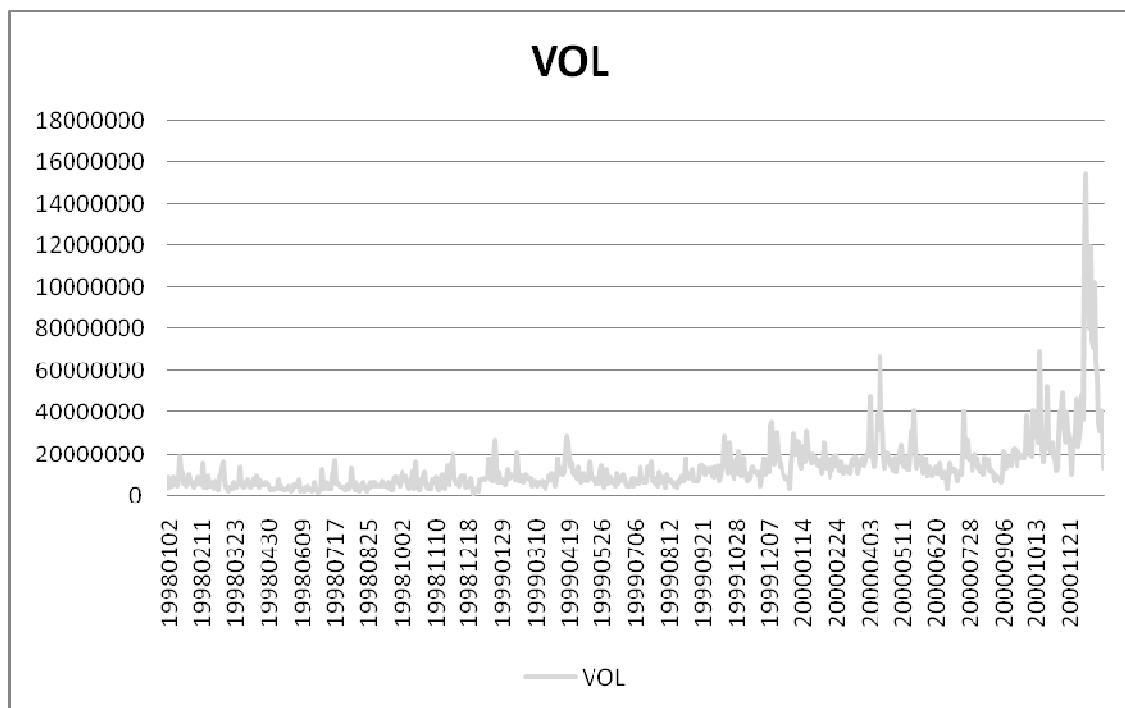
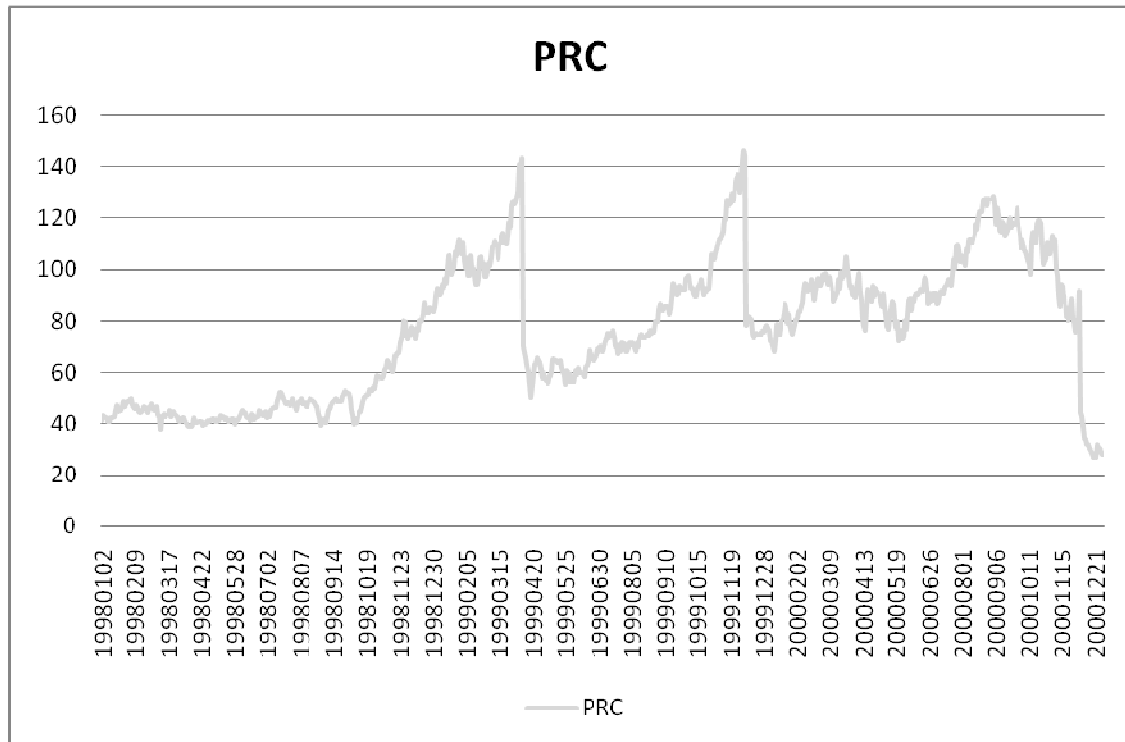
This contract was very important to Sebl since Great Plains Software was one of the most important software companies in middle United States. On June 5, 2000 it was reported **(NM)** by Interactive Week on a partnership agreement signed by Sebl and Quintus. On this date Sebl stock price decreased by 5.173% from the previous day to \$131.75. The trading volume registered for the day was 4,308,930 shares and the observed abnormal return was -6.77%.

Interactive Week reported **(NF)** on June 19, 2000 a list of the top 50 computer and technology companies in the United States with their corresponding growth in revenue and operating income, Sebl was one of the companies included in the

list. On this day the stock price increased by 7.08% from the previous day to \$168.1875. The trading volume for the day was 3,255,249 shares and the abnormal return observed was 6.25%.

Sun Microsystems Inc. (SUNW)

Sun Microsystems was the most important supplier of network products for business computers, which included: work stations, servers, software, microprocessors as well as maintenance service and consulting services concerning the products mentioned. The highest share price attained by Sun Microsystems during the period studied was \$146.50 (Dec. 6, 1999) and the lowest share price observed during the same period was \$26.9375 (Dec. 19, 2000). The average daily volume for Sun Microsystems' shares during the period studied was 13,300,438 million shares. The highest level of trading volume observed during this period was 154,507,466 million shares (Dec. 11, 2000) and the lowest registered level of trading volume was 1,330,396 million shares (Dec. 24, 1998).



The market capitalization for Sun Microsystems' shares during the period studied was \$44.516 billion and the company had 1.597 billion shares outstanding during the same period. The highest market capitalization for Sun between the year 1998 and 2000 was \$255 billion. The net income at the end of the quarter ended in December 2000 was \$720 million. The company's stock book value was \$3.40 and its P/E ratio was 60.59. Sun Microsystems' had total assets at the end of the year 2000 of \$14.152 billion, total sales of \$5.016 billion, return on assets during the period studied was 5.08%, the return on equity was 9.86% and the (EPS) was \$0.43. For the year ended on December 30, 2000 Sun Microsystems financial figures were as follows, expenditures of \$5.767 billion, total sales of \$15.721 billion, pretax income of \$2.771 billion and net income of \$1.854 billion. Sun's ROA and ROE for the same period was 13.10% and 25.36% respectively. The company's stock beta was 1.08099 for the year 1998, for the year 1999 the beta was 1.2859 and for the year 2000 the company stock beta was 0.98329. Sun's company shares had a "Buy" recommendation given by the investment firms Paine Webber and Bank of America Securities. The impact of news over stock price, returns and volume was as follows.

On January 19, 1999 the New York Times reported **(RD)** that Sony and Phillips had reach an agreement with Sun Microsystems (Sun) to develop a system network to allow home appliances to communicate between each other. On this day Sun's stock price increased by 4.85% to \$105.31. The trading volume for the day was 7,039,213 shares and the abnormal return observed was 3.64%.

On January 25, 1999 The Wall Street Journal reported **(NF)** that Sun's income had increased by 75%, from the previous year, surpassing investors' expectations. Sun's revenue also increased, by 22%. On this day the company stock price increased by 3.12% to \$101.06. The trading volume for the day was 6,728,639 shares and the abnormal return observed was 2.67%.

PC Week reported **(RD)** on June 21, 1999 that Motorola had signed an agreement with Sun, to construct a network that would improve Motorola's wireless infrastructure. The company stock price increased by 7.02%. The trading volume for the day was 10,435,425 shares and the abnormal return observed was 6.20%.

On September 3, 1999 American Banker reported **(NF)** that Sun would try to acquire Star Division Corp. Sun would try to change the way that emails, electronic worksheets and other computer programs are used. According to the article the company would try to make such programs more efficient and user friendly. Sun's company stock price increased to \$84.50. The trading volume for the day was 8,704,331 shares and the abnormal return observed was 4.349%.

On September 27, 1999 Computer Reseller News reported **(RD)** that Sun and Microsoft had joined forces in order to develop their systems applications and make them compatible. Sun's company stock price increased by 4.158%, the trading volume for the day was 11,481,570 and the abnormal return observed for the day was 3.29%.

On January 31, 2000 InfoWorld reported **(NM)** that Sun would make the Solaris 8 operating system's source code for free, giving its customers more freedom to customize the operating system. On this date Sun's stock price increased by 4.66% from the previous day to \$78.5625. The trading volume registered for the day was 18,593,642 shares and the abnormal return observed was 4.96%.

PC Week reported **(NM)** on April 10, 2000 that a statement made by Sun's officials about the guilty verdict in the trial of Microsoft revealed Sun's weak competitive strategies, and it also commented on the impact the verdict could have on Sun's production plans. On this day Sun's stock price decreased by 7.90% from the previous day to \$91. The registered trading volume for the day was 19,281,403 shares and the observed abnormal return was -6.45%.

On April 17, 2000 InfoWorld reported **(NM)** on the company created by CMGI, Novell Inc and Sun Microsystems. The company would be named CMGion and would build data centers and a hosting network. On this day Sun's stock price increased by 10.94% from the previous day to \$84.75. The trading volume registered for the day was 41,165,239 shares and the abnormal return observed during the day was 11.65%.

On June 19, 2000 InfoWorld reported **(NM)** that Sun unveiled plans to enter the rapidly growing network storage market. On this date Sun's stock price increased by 4.51% to \$95.43. The trading volume registered for the day was 12,153,022 shares and the observed abnormal return was 3.98%.

On August 7, 2000 eWeek reported **(NM)** on Sun's entry into a partnership with Linuxcare Inc. to develop a driver that enables Sun's StorEdge T3 enterprise

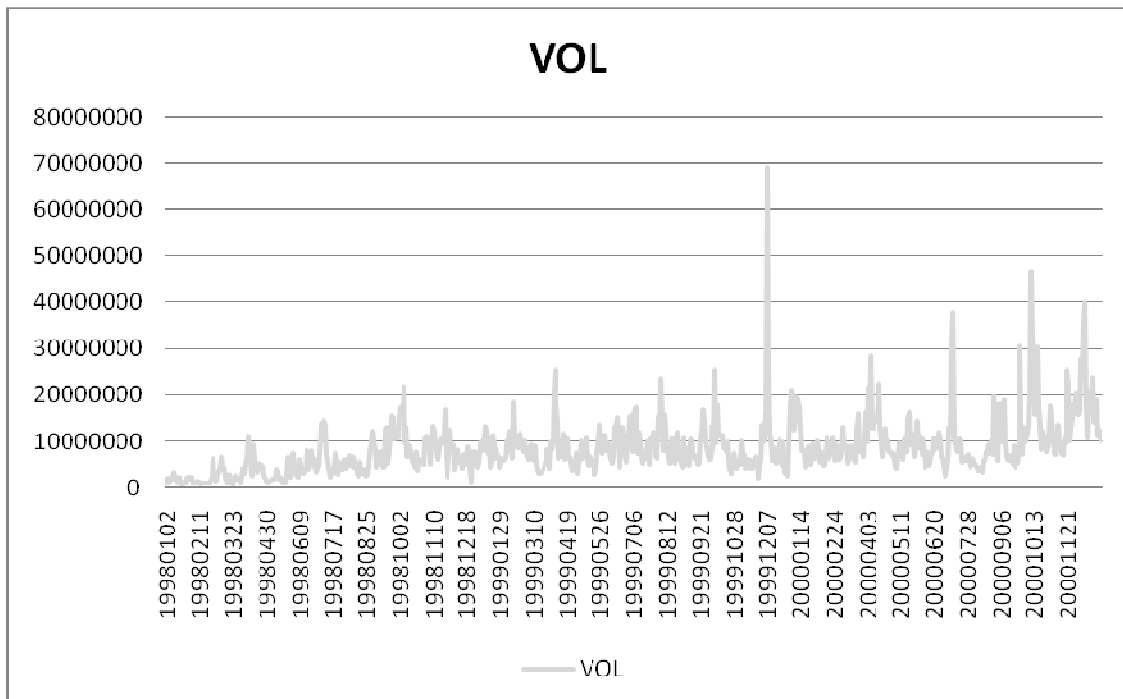
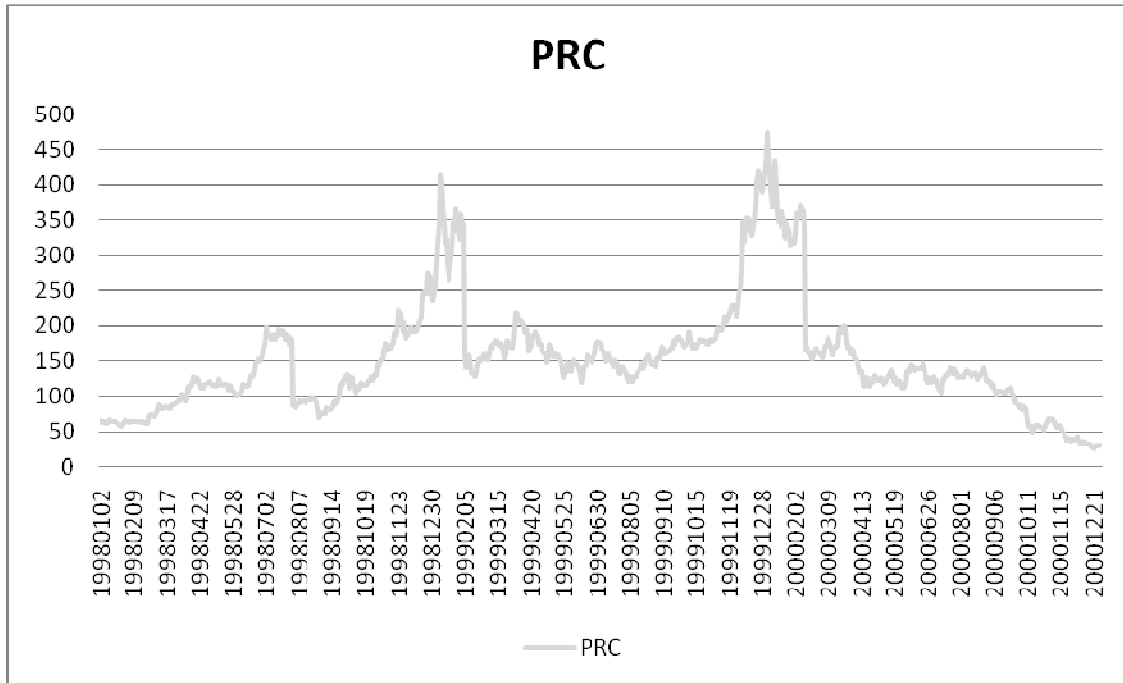
storage devices to work with Intel's servers. On this day Sun's stock price increased by 4.80% from the previous day to \$111.75. The trading volume for the day was 18,095,120 shares and the observed abnormal return was 3.93%.

Different news sources reported **(NM)** on December 11, 2000 on the failure of Sun's operating system Solaris 8 to become compatible with Linux. On this date Sun's stock price decreased by 12.68% to \$34. The trading volume registered during the day was 154,507,466 shares, and the observed abnormal return was -14.08%.

Yahoo! Incorporated (YHOO)

Yahoo! Inc is a global Internet company that offers an assortment of Internet services, communication, media and e-commerce to more than 100 million users worldwide. Yahoo! was the leading Internet search engine during the period studied, and it served businesses as well as individuals. The company has offices located in Europe, The Pacific Basin, Latin America, Canada and the United States. The company had strategic alliances with Hewlett Packard, Toshiba, Gateway, Healtheon, and Phoenix Technologies. Yahoo! reached its highest share price during the period studied of \$475 on Jan. 3, 2000 and the company recorded its lowest share price during the same period of \$25.625 on Dec. 21, 2000, an amazing decrease in less than a year. The average daily volume for Yahoo's shares during the period studied was 8,326,954 shares. The highest trading volume level occurred on Dec. 7, 1999, and the total trading volume for that day was 69,006,068 million shares. The lowest level of trading

volume occurred on Feb. 12, 1998 and the total shares traded that day were 568,505.



The market capitalization for Yahoo's shares during the period studied was \$16.884 billion and the company had 561.65 million shares outstanding during the same period. Yahoo's highest market capitalization between the year 1998 and the year 2000 was \$126.539 billion. The book value of the stock was \$2.37 and the company P/E ratio was 176.83.

Yahoo! had total assets at the end of 2000 of \$2.269 billion, total sales of \$310 million, the return on assets for the company during this period was (4.31%), the return on equity during the same period was (5.157%) and the (EPS) was (\$0.17). For the year ended on December 30, 2000 Yahoo's! financial figures were as follow: expenditures of \$611.5 million, total sales of \$1.110 billion, pretax income of \$264.11 million and net income of \$70.76 million. Yahoo's! ROA and ROE for the same period were 3.11% and 3.73% respectively. The company shares were given a "Strong Buy" recommendation during the period studied, by CIBC World Markets and E*Offerings. It is interesting to point out that even with a low ROA and ROE compared to the other companies in the study, Yahoo posted the highest P/E ratio and the highest share price, clearly indicating a very overvalued price. Let's take a closer look at the company's shares price movements, changes in returns and volume.

On December 15, 1998 it was reported **(NM)** in the Wall Street Journal that Yahoo would utilize a new technology that would allow its customers to access previously saved information, from any computer, through the Internet. On this day Yahoo's share price increased by 3.50% to \$198. The trading volume for the day was 4,109,596 shares and the abnormal return observed was 2.27%.

On December 28, 1998 it was reported **(NF)** in the Wall Street Journal Delia's Inc. had seen an unprecedented increase in its sales, since it was conducting its selling efforts through Yahoo's web site. On this day Yahoo's stock price increased by 11.48%. The trading volume for the day was 7,651,003 shares and the abnormal return observed was 10.74%.

Apparently investors saw this article as very good publicity for Yahoo, and as a potential for other companies doing similar businesses with Yahoo. On January 8, 1999 it was reported **(NM)** in the Wall Street Journal that IBM had reached an agreement with Yahoo to offer a personalized service to IBM personal computer clients that bought their computers through Yahoo's web site. On this day Yahoo's stock price increased from \$320 to \$343.625. The trading volume for the day was 7,816,308 and the abnormal return observed was 4.52%.

On January 13, 1999 it was published **(NF)** in the New York Times that Yahoo's stock seemed to be overvalued, and very volatile. On this day Yahoo's share price decreased from \$402 to \$368, the trading volume registered for the day was 12,333,197 and the abnormal return observed was -7.865.

The news seemed to have caused concerns to investors causing them to sell Yahoo's shares and causing the stock price to fall during the trading session. On January 25, 1999 it was reported **(NF)** in Newsbytes News Network that Fox News Corporation and Yahoo had reached an agreement that would allow Fox to feature Yahoo's search engine on their nine news networks. On this date Yahoo's stock price increased by 9.09% to \$312. The trading volume registered

during the day as 6,232,868 shares and the abnormal return observed was 7.8575%.

On January 26, 1999 the New York Time reported **(NM)** that Fox's and Yahoo's joint venture would be announced during the Super Bowl. During the time, a 30 second television spot during the Super Bowl use to cost \$1 million, the high price is justified since it is the event that draws the largest television audience during the year in the United States. On this day Yahoo's stock price increased from \$312 to \$351.25. The trading volume for the day was 8,418,464 shares and the abnormal return observed was 10.59%.

The Wall Street Journal reported **(NF)** on January 27, 1999 that Yahoo would acquire Geocities for \$3.5 billion. Yahoo's stock price decreased during the day to \$335.875. The trading volume during the day was 6,990,391, and the abnormal return observed was -4.01%.

On March 23, 1999 it was reported in the Wall Street Journal that Yahoo would acquire **(NF)** Broadcast.com, an Internet based radio news channel. The company had never declared revenues. Yahoo's share price decreased by 5.75%, the trading volume for the day was 5,207,529 and the abnormal return observed was -3.579%.

USA Today reported **(NM)** on March 25, 1999 that Yahoo and Microsoft would work together to develop a Japanese version of Carpoint, which is an Internet based car dealer. On this day Yahoo's stock price increased from \$160.50 to \$179. The trading volume registered for the day was 8,239,080 and the abnormal return observed was 8.33%.

On April 28, 1999 it was reported **(NM)** in the New York Times that Yahoo would unveil a new communication system that would allow up to 10 people to communicate at the same time with each other via the Internet. The company stock price decreased from \$184.50 to \$173.50, the trading volume for the day was 4,744,742 and the abnormal return observed was -7.875%.

The news was perceived as not beneficial to Yahoo since the service could only be used for up to a minute. On June 3, 1999 it was reported **(NF)** in the New York Times that Yahoo would acquire Online Anywhere for \$80 million, the company offered Internet directory applications. Yahoo's share price decreased by 5% during the day, from \$142.50 to \$135.375. The trading volume registered during the day was 7,748,879 and the abnormal return observed was -6.36%.

On September 23, 1999 it was reported **(NM)** in the Wall Street Journal, that Yahoo was becoming an important competitor to Ebay.com, the premier auction site on the Internet. During this day Yahoo's stock price experienced a decrease of 3.20%. The trading volume for the day was 16,729,798 and the abnormal return observed was 1.75%.

Wireless Week reported **(NM)** on January 3, 2000 about an alliance between Cellmania.com and Yahoo.com to market its products. On this day Yahoo's stock price increased by 9.79% from the previous day to \$475. The trading volume registered during the day was 9,822,356 shares and the abnormal return observed was 8.61%.

On April 3, 2000 Interactive Week reported **(NF)** on the United States Federal Trade Commission probe into how Yahoo! Inc. handles consumers' data. On this

day Yahoo's stock price decreased by 6.56%. The trading volume registered during the day was 9,799,657 shares and the observed abnormal return was -4.82%.

PC Week reported **(NM)** on April 10, 2000 on the failure of Yahoo to maximize its venture into the business to business electronic commerce market. On this day Yahoo's stock price decreased by 6.07% from the previous day to \$141.93. The trading volume registered for the day was 12,653,068 shares and the observed abnormal return was -5.065%.

On June 26, 2000 InfoWorld reported **(NM)** on the entry of Yahoo in the corporate portal market, and the partnership between Yahoo and Tibco Software. On this date Yahoo stock price decreased by 4.78% from the previous day. The registered trading volume for the day was 11,829,851 shares and the abnormal return observed during the day was -5.998%.

On September 25, 2000 Publishers Weekly reported **(NM)** on how Barnesandnoble.com (BN.com) had replaced Amazon.com as the featured online bookseller on Yahoo. The article also comments on the efforts by Yahoo and BN.com to stay competitive in the market. On this day Yahoo's stock price decreased by 5.32% from the previous day to \$105.50. The registered trading volume for the day was 5,143,820 and the observed abnormal return was -5.718%.

On November 20, 2000 eWeek reported **(NM)** on the partnership between Salesforce.com and Yahoo, and how it was proposed by salesforce.com to supply sales force automation services to Yahoo's Small Business Center site.

On this day Yahoo's stock price decreased by 4.63% from the previous day to a price of \$48.875. The registered trading volume for the day was 9,581,331 shares and the observed abnormal return was -3.212%.

Analysis by News Categories

The analysis of the news by categories will be discussed in this part of the study. A total of 144 relevant news events were observed and analyzed during this study. The distribution of the news by categories was as follows: 59 Financial News **(NF)** were observed, followed by 66 Marketing News **(NM)**, 15 Research and Development News **(RD)** and only 3 Human Resources related news **(HR)**.

Financial News (NF)

The average cumulative abnormal return for the NF news category on the day of the event was -0.01651, with a J_1 of -2.42. The average abnormal return for the event date was -.02145 (see appendix B) and the average trading volume observed on the event date when this type of news was released was 22,463,792 shares.

Event day	Avg. AR	Avg. CAR	J_1	Avg. Vol.
-3	0.001656	0.001656	0.069682	18396154
-2	0.003375	0.005031	1.285372	18343259
-1	0.000771	0.005802	0.640489	20425443
0	-0.02145	-0.01565	-2.41356	22463792
1	-0.00328	-0.01893	-1.3523	20393099
2	-0.00898	-0.02791	-2.52748	17498486
3	-0.00205	-0.02996	-7.34012	16563878

As it can be interpreted by the J_1 test of H_0 , the abnormal returns are different from zero. Apparently the news conveyed had an impact on the returns. A higher volume can also be observed during and around the event date, which would indicate an interest on the part of the investor to the news received. It seems that the negative NF news outweighed the positive NF news and hence the negative abnormal return.

Marketing News (NM)

The average cumulative abnormal return observed in the NM news category was -0.05889 on the return of the company stock during the day of the event studied, the average abnormal return on the event date was -0.04049 (see appendix B) and the average trading volume observed for this category was 19,113,700 shares during the event date.

Event day	Avg AR	Avg CAR	J_1	Avg. Vol.
-3	-0.01306	-0.01306	-0.54892	12381251
-2	-0.00562	-0.01868	-2.49528	12361427
-1	0.000277	-0.01841	-4.18342	16739934
0	-0.04049	-0.05889	-2.01633	19113700
1	-0.00276	-0.06166	-9.70744	15846832
2	-0.0017	-0.06335	-8.91985	13989073
3	-0.00671	-0.07006	-4.70029	12345379

The NM news category has an J_1 test of H_0 , at the moment of the event date of -2.0163, which seems to indicate that this news category also had an impact over the returns, providing abnormal returns. The trading volume also rose around

and during the event date, which seems to indicate that investors were swayed to trade based on the news received.

Research and Development News (RD)

The average cumulative abnormal return for the news category RD was 0.02999 on the event date. The average abnormal returns during the same date was 0.03441 (see appendix B) and the average trading volume observed on the event date for this category was 18,746,724 shares. The problem encountered with this category as well as the HR news category, was the limited amount of news found for each. This could be resolved for a later study by equally weighting the news categories.

Event day	Avg AR	Avg CAR	J_1	Avg. Vol.
-3	-0.00989	-0.00989	-6.25985	13243997
-2	-0.0057	-0.01559	-4.27391	13961154
-1	0.011164	-0.00443	-1.2135	15368828
0	0.034419	0.029992	8.22175	18746724
1	0.011081	0.041073	11.25943	19213307
2	0.002205	0.043278	11.86391	19054161
3	-0.00574	0.037542	10.29142	14025700

It is interesting to notice how the average trading volume remained relatively high during the event date and around the event date. The J_1 test of H_0 at the event date was 8.221, later studies should increase the sample of this news category in order to have more comprehensive results.

Human Resources News (HR)

For the HR category the average cumulative abnormal return was the lowest of the four categories at the event date -0.00056 and the average trading volume for this category during the event date was 40,782,246 shares. The average abnormal return for this category during the event date was 0.04366 (see appendix B). As stated before a very limited amount of human resources news were found during this period. Therefore the number presented on both the CAR and the average CAR, as well as average trading volume, might not be representative, and in the future a larger sample should be taken in order to have more robust and clearer results.

Event day	Avg AR	Avg CAR	J_t	Avg. Vol.
-3	0.007674	0.007674	18.2031	11136553.67
-2	-0.03168	-0.024	-34.2351	13853790
-1	-0.02022	-0.04422	-104.659	13193176.33
0	0.043666	-0.00056	-0.05221	40782426.33
1	-0.00466	-0.00522	-44.6365	19624790
2	-0.07875	-0.08397	-75.955	15030490
3	-0.02703	-0.111	-1380.94	10886883

As a preliminary result, excluding the before mentioned categories HR and RD, it seems as if Financial News and Marketing News have an impact over investors behavior judging from the changes in volume around the event date and at the moment of the news release (see appendix C), the results on cumulative abnormal returns, as well as the average cumulative abnormal return is comparable to other studies done concerning the release of corporate

information. In this study the size of the event window was limited to three days before and three days after the event date; the event window should be larger as to have a better understanding of the impact of the event, since it might not be known exactly when the event affected investors' behavior, trading and returns. Another fact that the reader should take into account is that the analysis was done during the period of the Internet bubble, where there was a lot of noise affecting the prices of stocks and their returns, as well as a large "irrational behavior" and highly speculative behavior, on the part of investors that might have added more noise to the market. Although the news presented seem to have an impact over the returns and produced abnormal returns, this should be studied more in dept, as stated before by "opening" the event window, and standardizing the cumulative and abnormal returns for noise in the system.

CHAPTER 5

Conclusions

As it can be observed in the study there is an apparent although small effect of different news and how investors might perceive them. This should be looked more in dept and taking the recommendations mentioned above in order to improve the study results. As mentioned before although the news appeared to have an impact the changes in prices and returns cannot be attributed to only one factor, this being the news reported, given the level of noise in the market during the time studied and the excessive and perhaps compulsive trading behavior on the part of investors. Also there could have been other factors affecting the company stocks prices and returns that were not taken into account in this study. Nevertheless it would still be very interesting to recreate this study during the same period once again, but utilizing the recommendations given to see what would be the changes in results. This period is especially interesting to study from the point of view of investor behavior and perception of information, given the fact that during the second half of the 1990's there was a boom in the creation of online traders available to investors. These online traders like Ameritrade, E-Trade, Schwab Online and others allowed average investors to trade directly in the market, without the guidance of a professional. The question that arises is, what experience do these investors have on trading in the financial markets? Do they have the ability to interpret correctly the financial information made public by corporations? If not, on what do these investors base their decisions to buy or sell a security and on what type of securities to invest?

Usually these are the type of investors that are more prone to base their decisions on “soft information”, rumors, analysts’ views, statements made in the press etc. As mentioned in the literature review given the time constraints and knowledge constraints that investors face, as well as the constant bombardment of information being received it would be really difficult to imagine that an average investor would be able to look at all the available information to make their financial decisions, therefore it is very probable that he/she will base their decisions on the most readily available information that they consider might change or affect their investments or potential gain. As discussed at the beginning of the study, in the field of finance we are far from a perfect model that can explain or predict changes in prices and returns. The prevalent view, which is the Efficient Market Hypothesis, leaves a lot of issues unexplained, and some of them, it doesn’t even take them into account. While theoretical models of efficient markets have their place as illustrations or characterization of an ideal world, we cannot maintain them in their pure form as accurate descriptors of actual financial markets. As we have seen from different studies, as stated before, there are many different factors that the current efficient market theory does not take into account, the most important being the investors’ psychology. It sees the investor as a “rational being” that always makes the best choices and utilizes all the information available to him/her. But as we have seen from the evidence available, this is far from true. If investors were fully rational, at the time of their investments, they would realize the extreme risks they were facing by investing in corporations that virtually showed no financial gains for years, instead these

investors focused mostly in the “potential future financial gains” they expected from their investments. This example is much like the actual “burst” of the sub-prime mortgage bubble and the mortgage backed securities (MBS) subsequent demise, where trillions of dollars have been lost due to faulty risk assessment on the part of investors and institutions. If investors would have realized the real risk they were incurring by investing in MBS and Collateralized Mortgage Obligations (CMO's) that were supposed to be well collateralized by mortgages, but were not, they surely would not have invested the large amount of capital they did in such specialized, highly complex and potentially risky financial instruments and derivatives. It is not to say that the investors are irrational, but rather, that when they are faced with different situations, they might act on different levels of rationality. Also, it's not that the financial markets are crazy, but they contain quite substantial noise, so substantial that it might dominate the movements in the aggregate market. This is why in my opinion we should investigate in more depth this issue and it is of great importance to take into account what type of news will investors pay more attention to, because this will impact trading behavior, and prices, and as seen during the Internet bubble it can lead to very high unsustainable prices. This situation affects everyone from corporate managers and their timing of investment decisions, or issuing of new stocks or bonds, to financial planners and their asset allocation, to the everyday investor trying to make some additional returns in the market, and definitely to researchers who try to look for new ways to explain the behavior of the financial market, the

use of better tools to explain price movements, returns and changes in the financial market.

Conclusión

Como se desprende de éste estudio existe un aparente, aunque pequeño, impacto de las noticias clasificadas por grupos, sobre el precio de los valores en el mercado y las decisiones de los inversores. Este impacto debe ser investigado más a fondo tomando en cuenta las recomendaciones mencionadas en el estudio. Como se menciona anteriormente aunque las diferentes categorías de noticias aparentan tener un impacto sobre los precios/rendimientos de los valores estudiados, estos cambios no deben ser atribuidos a este único factor dado el nivel de ruido en el mercado durante el momento histórico estudiado y el comportamiento de compra-venta de valores excesivo y hasta compulsivo, por parte de los inversores durante la “burbuja de la Internet”. También pudo haber otros factores que afectaron los precios y rendimientos de las acciones de capital, pero que no fueron tomados en cuenta en esta investigación.

El periodo de la “burbuja de la Internet” durante los años noventa es uno muy interesante y de mucha utilidad para poder estudiar el comportamiento de los inversores y la percepción que estos tienen sobre la información presentada. Es muy importante el hecho de que durante la segunda mitad de la década de los noventa hubo una explosión en la cantidad de “online brokers” (corredores de valores en línea) disponibles a los inversores. Corredores en línea como Ameritrade, E-Trade, Schwab Online y otros, empezaron a ofrecer sus servicios

y ofrecer acceso directo al mercado de valores a inversores comunes, no necesariamente educados en métodos de inversión y sin una supervisión u orientación profesional. Las preguntas que deben surgir entonces son: ¿Qué experiencia o conocimiento tenían estos inversores acerca la compra y venta de valores en los mercados financieros?, ¿Tenían la habilidad estos inversores de interpretar correctamente la información financiera emitida por las corporaciones públicas y otras fuentes de información financiera? Si la respuesta es negativa, entonces, ¿En qué basaban sus decisiones estos inversores acerca la compra y venta de una acción de capital y en qué tipo de instrumentos invertir?

Usualmente este tipo de inversor tiende a fundamentar sus decisiones lo que se conoce como “soft information” o información sin peso como rumores, recomendaciones de personas que los inversores entienden que conocen del mercado de valores, recomendaciones de analistas, noticias en la prensa, etc.

Como es mencionado en el repaso de la literatura, dadas las limitaciones que enfrentan los inversores en cuanto al tiempo disponible para la toma de una decisión de invertir o no en un valor financiero y el constante bombardeo de información que estos inversores reciben, es algo difícil imaginar que un inversor promedio tenga el tiempo y la habilidad de poder analizar toda la información disponible sobre una acción de capital a la hora de tomar decisiones de inversión. Por lo tanto, es muy probable que este inversor base sus decisiones en la información que se le haga más fácil obtener y entender, y que estos creen que dicha información represente un evento que pueda afectar sus inversiones, trayéndoles posibles ganancias o pérdidas.

Como se discute al principio del estudio, el campo de las finanzas está bastante lejos de tener un modelo perfecto que explique y pueda predecir los cambios en precios y rendimientos de valores financieros. La idea prevaleciente durante muchos años, la Hipótesis de Mercados Eficientes (HME), deja muchos factores sin explicar y muchos otros se podrían mejorar. Mientras modelos teóricos de mercados eficientes tienen su espacio como ilustraciones o una caracterización de un mundo ideal, no se pueden mantener en su forma pura como una descripción correcta de los mercados financieros reales. Como se desprende de diferentes estudios discutidos en el repaso de literatura, hay diferentes factores que la HME no toma en cuenta, el más importante de estos factores es la psicología del inversor. La HME clasifica al inversor como un ente racional que siempre toma la decisión que optimizará su inversión, según la información disponible. Sin embargo, según muestra la evidencia de los estudios en la revisión literaria, esto no necesariamente es cierto. Si los inversores durante la burbuja de Internet, hubiesen sido completamente racionales, se hubiesen dado cuenta de los grandes riesgos que estaban incurriendo al invertir en corporaciones que llevaban años sin mostrar ganancias en sus estados financieros. Estos inversores se enfocaron en el potencial de ganancias futuras o esperadas de las empresas en las que invertían sin tomar en cuenta el riesgo de la inversión. Esto se asemeja mucho a la caída de la burbuja del mercado hipotecario “sub-prime” y los instrumentos financieros respaldados por hipotecas (mortgage backed securities, MBS), donde desaparecieron trillones de dólares a causa de una mala estimación por parte de los inversores del riesgo real que

representaban dichas inversiones e instrumentos financieros. Si los inversores hubiesen hecho un avalúo correcto del riesgo real al que se estaban exponiendo al invertir en instrumentos financieros como los MBS y los CMO (collateralized mortgage obligation u obligaciones hipotecarias colateralizadas), definitivamente no hubiesen invertido en estos instrumentos, ya que la cantidad de hipotecas que servían de colateral para dichos instrumentos no eran suficientes. Cabe señalar que la alta complejidad de estos derivados financieros hacía muy difícil poder evaluar correctamente su riesgo real.

No es que los inversores no sean racionales, sino más bien, que cuando se presentan diferentes situaciones, los inversores actúan con diferentes grados de racionalidad. Y tampoco es que los mercados se comporten de una manera irracional, sino que como presenta Black (1986) hay mucho “ruido” en los mercados y esto puede afectar los movimientos generales de los mercados de valores. Por tal razón es importante que se investigue a fondo a que tipo (clases) de noticias los inversores le prestan más atención ya que esto afectara su comportamiento de inversión y la toma de decisiones. Según sean las decisiones de los inversores, se afectarán los precios de los valores financieros en los mercados y esto puede llevar a la creación de una burbuja de precios insostenibles que luego caen, tal y como sucedió durante el principio de la década del dos mil con la caída de la burbuja de las compañías de Internet. Esta situación afecta a todos los componentes y participantes de los mercados de valores, desde un gerente corporativo y sus decisiones de inversión o nuevas emisiones de bonos corporativos o acciones de capital, a un manejador de

fondos de inversión y la composición de activos que desee incluir en su cartera de inversiones, a un inversor promedio que busque obtener rendimientos positivos en el mercado de valores. Estudiar qué categoría de noticias tiene mayor peso sobre la toma de decisiones de los inversores, puede llevar a entender mejor los movimientos de precios en el mercado de valores financieros. A los investigadores les puede ser especialmente útil conocer que tipos de noticias afectan más la toma de decisiones de los inversores y su comportamiento, para crear mejores herramientas y modelos que expliquen mejor los movimientos de precios, rendimientos y cambios generales en los mercados financieros.

Recommendations

A series of recommendations are made for future studies. First the problem encountered with the RD and HR news category should be addressed as a limited amount of news was found for each category, and the results for these two categories might not be representative. This could be resolved for a later study by equally weighting the news categories or also a larger sample should be taken in order to have more robust and clearer results. Second, the size of the event window should be expanded in order to have a better understanding of the impact of the event, and it should also serve as a better fit for news impact results. The biggest limitation to the small window presented was that it might not be known exactly when the event affected investors' behavior, trading and

returns. Another recommendation would be to include changes in returns smaller than 3% (positive or negative), this way a larger amount of news sampled would be useful. Although the news presented seem to have an impact over the returns and produced abnormal returns, this should be studied more in dept, as stated before by “opening” the event window, and standardizing the cumulative and abnormal returns for noise in the system. In order to make the difference in average abnormal returns be clearer, it would be a good idea to divide each news category by positive news and negative news, this way average returns would not cancel out, and the real impact would be more noticeable. It would also be interesting to see what would be the outcome if the study took into account different international financial markets, where the expectations of the investors might tend to be different. Another recommendation would be to do a similar study, taking into account the age of the investors, since at different age stages the trading behavior depending on risk should be different. It would be interesting to see how older investors that are nearing their retirement react to changes differently than younger investors would. It would also be interesting for future studies to conduct a “controlled experiment” with graduate finance students and provide them with different corporate news, in order to see their reactions and gather their opinions on the impact the information received had on their behavior and perceived outcome. It would also be helpful to measure how different weights in compensation and changes in it are perceived by investor (imagery and affect)²⁸, based on the model proposed by MacGregor, Slovic,

²⁸ Affect can be viewed as a quality assignment to a stimulus or object, such as a company or investment opportunity.

Dreman, and Berry (MSDB), on their study of Imagery, Affect and Financial Judgment (2000). According to these authors, word association techniques are strongly rooted in the history of psychology and are capable of revealing the cognitive and affective elements of images people hold about complex stimuli. As stated in the propositions the affect and imagery, or perception of the investor, should have a powerful effect on the judgments about performance and quality of securities. For future studies it would be interesting to conduct an investigation with a bigger scope or timeline, taking into account five or more years before the Internet bubble, the actual time that the bubble occurred, and five or more years after the bubble. This would be interesting to do in order to see what factors/information affected investor behavior the most, and if those same factors/information had the same effect after the bubble.

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Appendix A

Added Reviewed Literature

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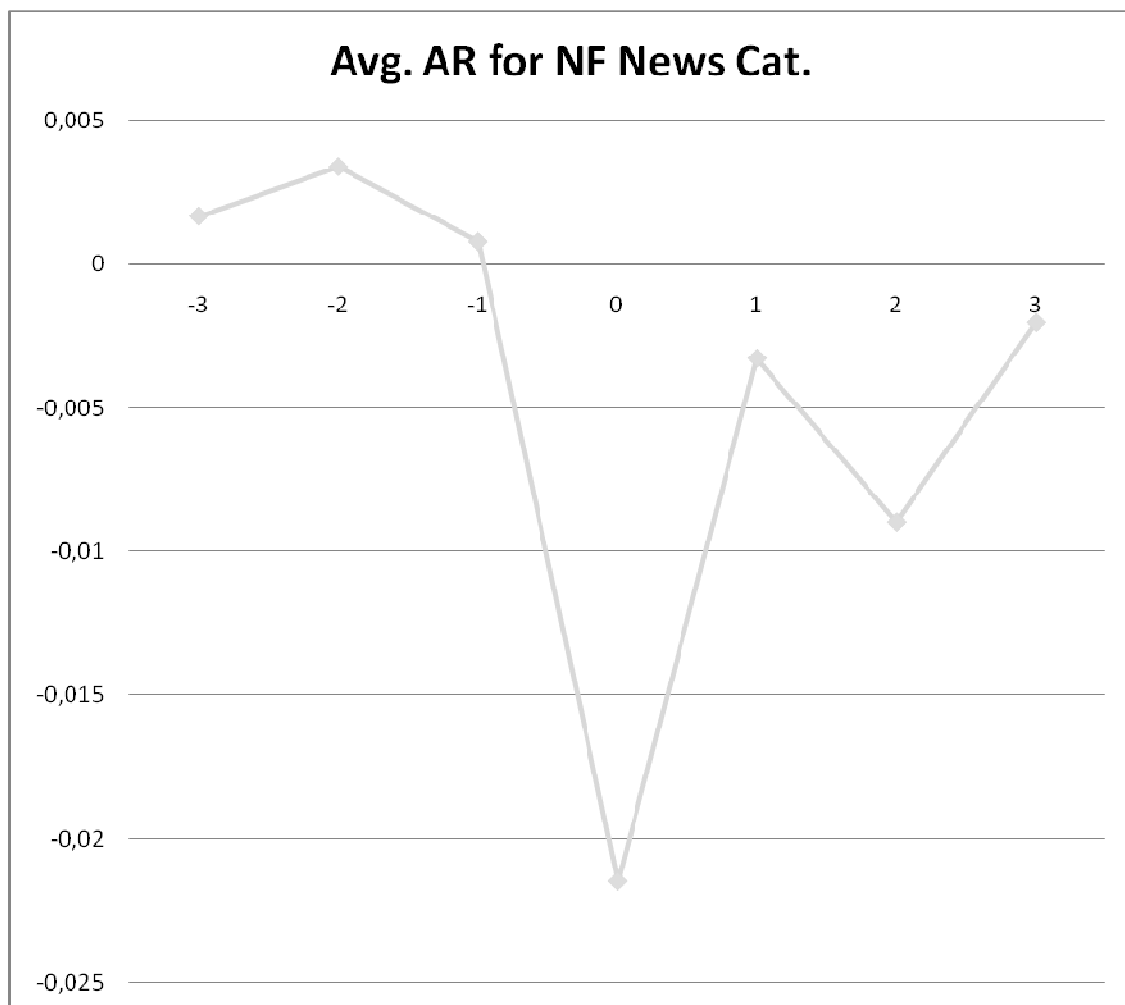
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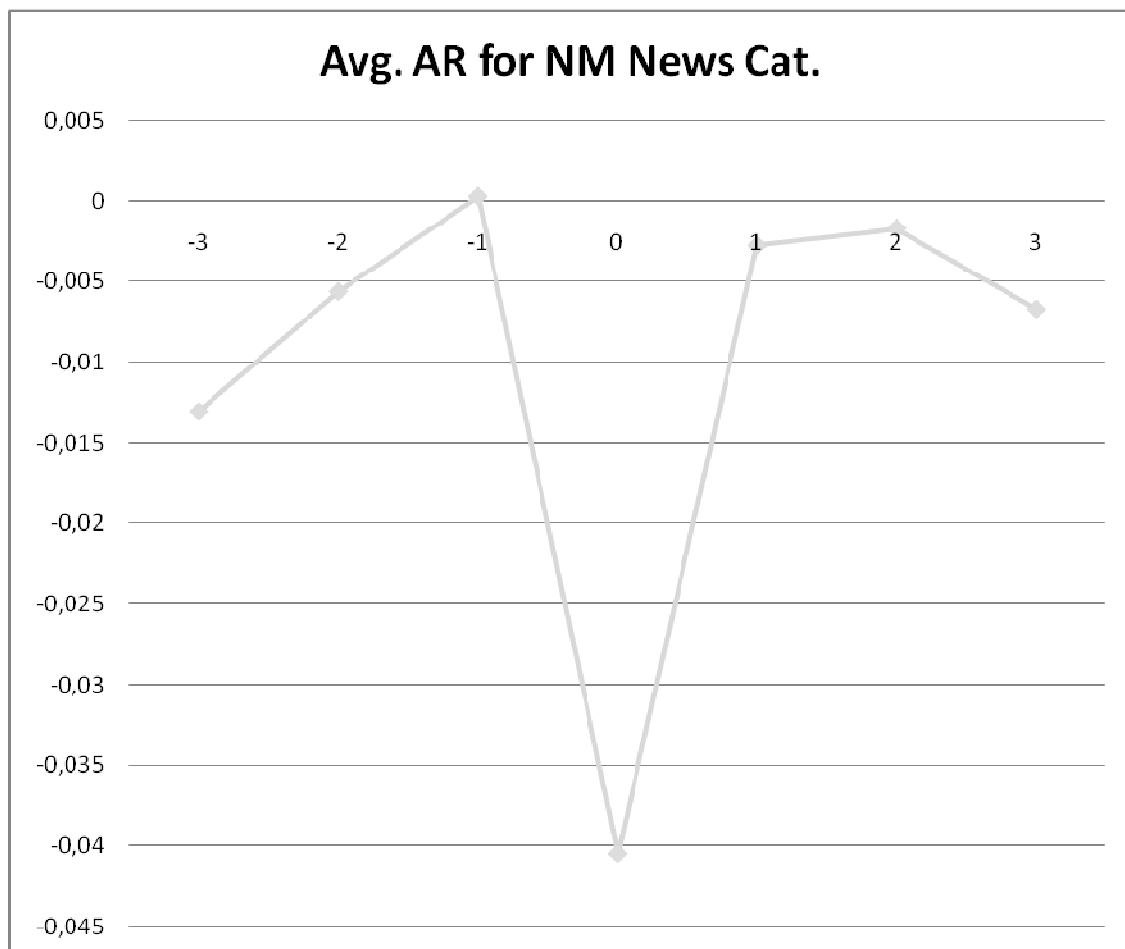
Appendix B
Average Abnormal Returns Tables

Average Abnormal Returns for NF News Category



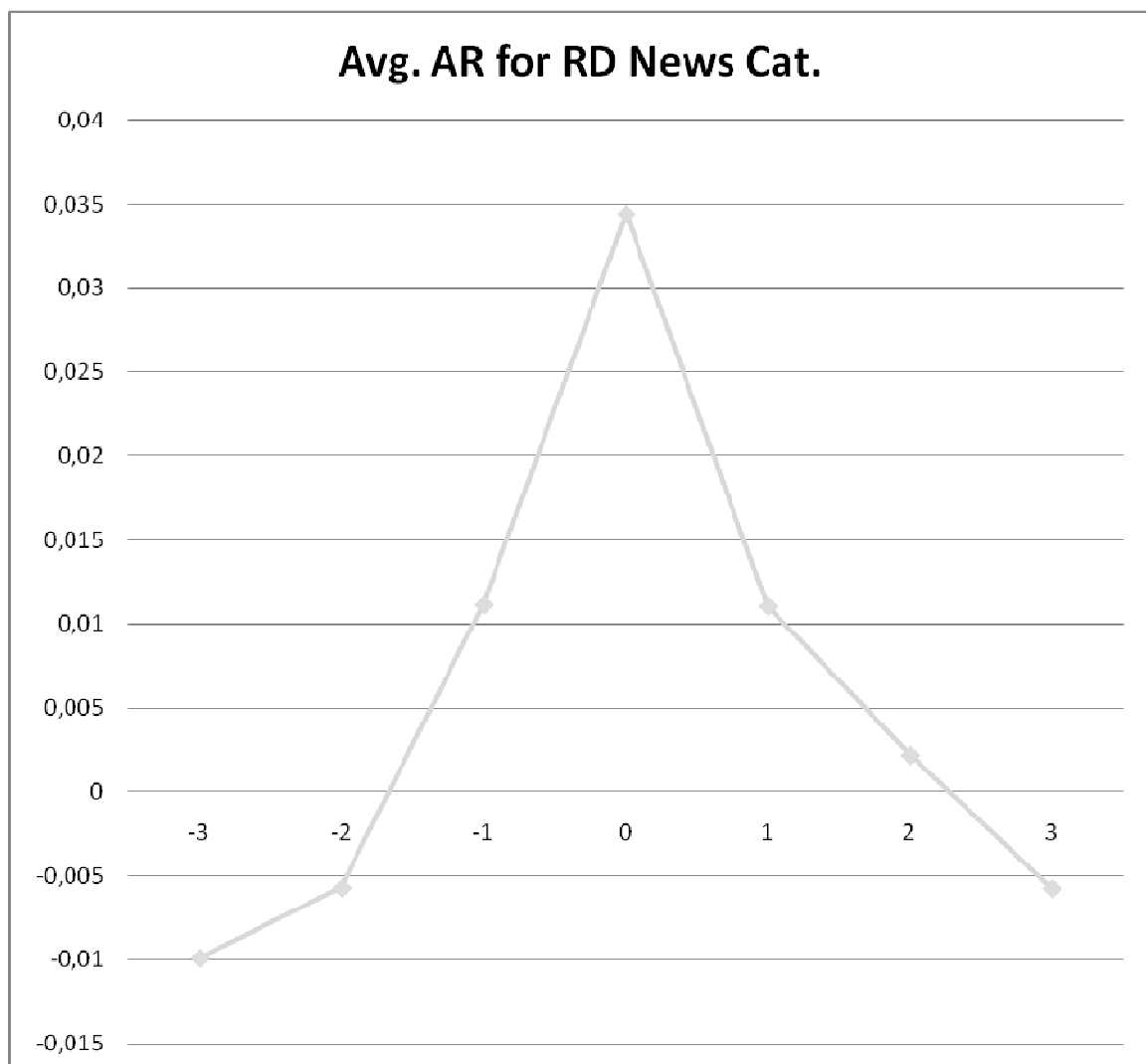
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Average Abnormal Returns for NM News Category



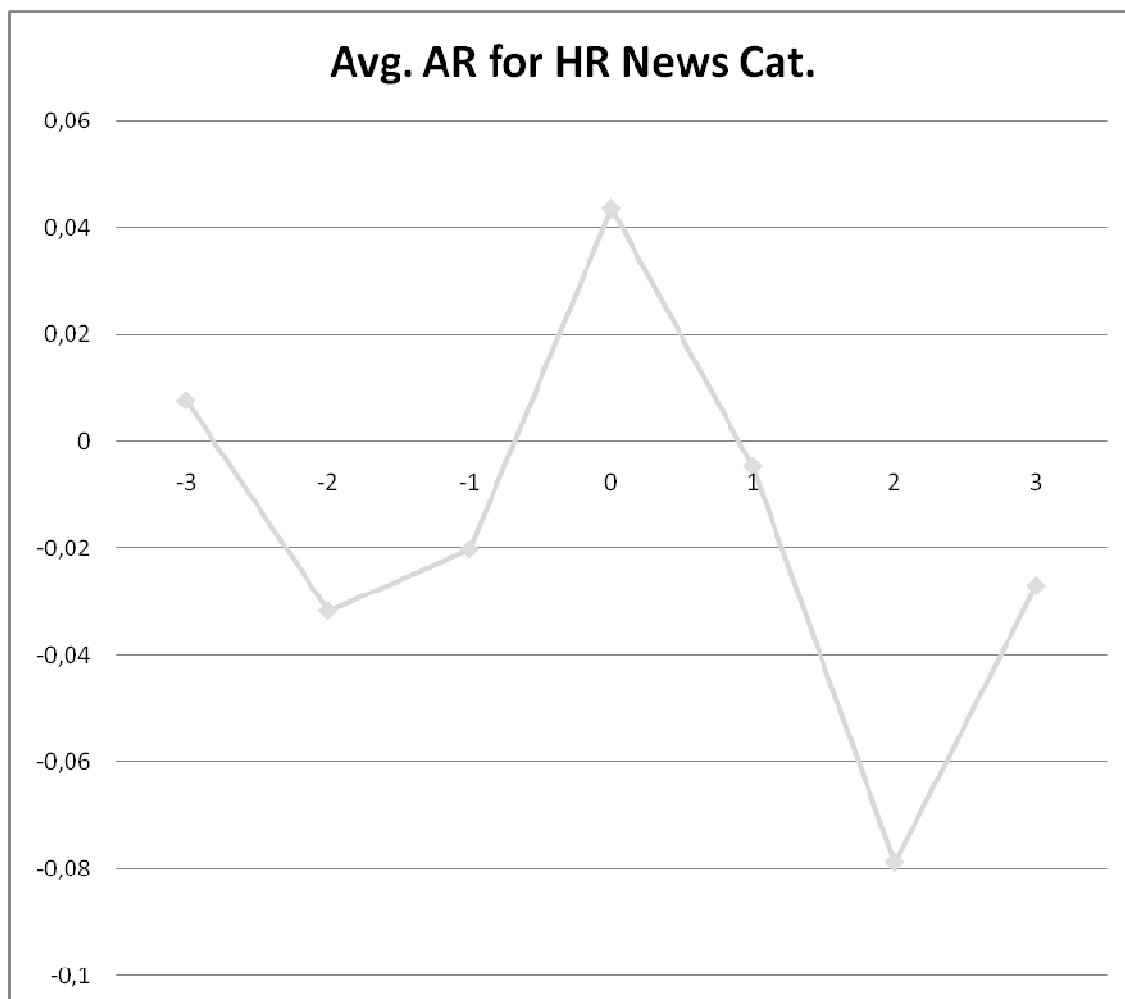
(Vertical axis: abnormal return, horizontal axis: event date)

Average Abnormal Returns for RD News Category



(Vertical axis: abnormal return, horizontal axis: event date)

Average Abnormal Returns for HR News Category

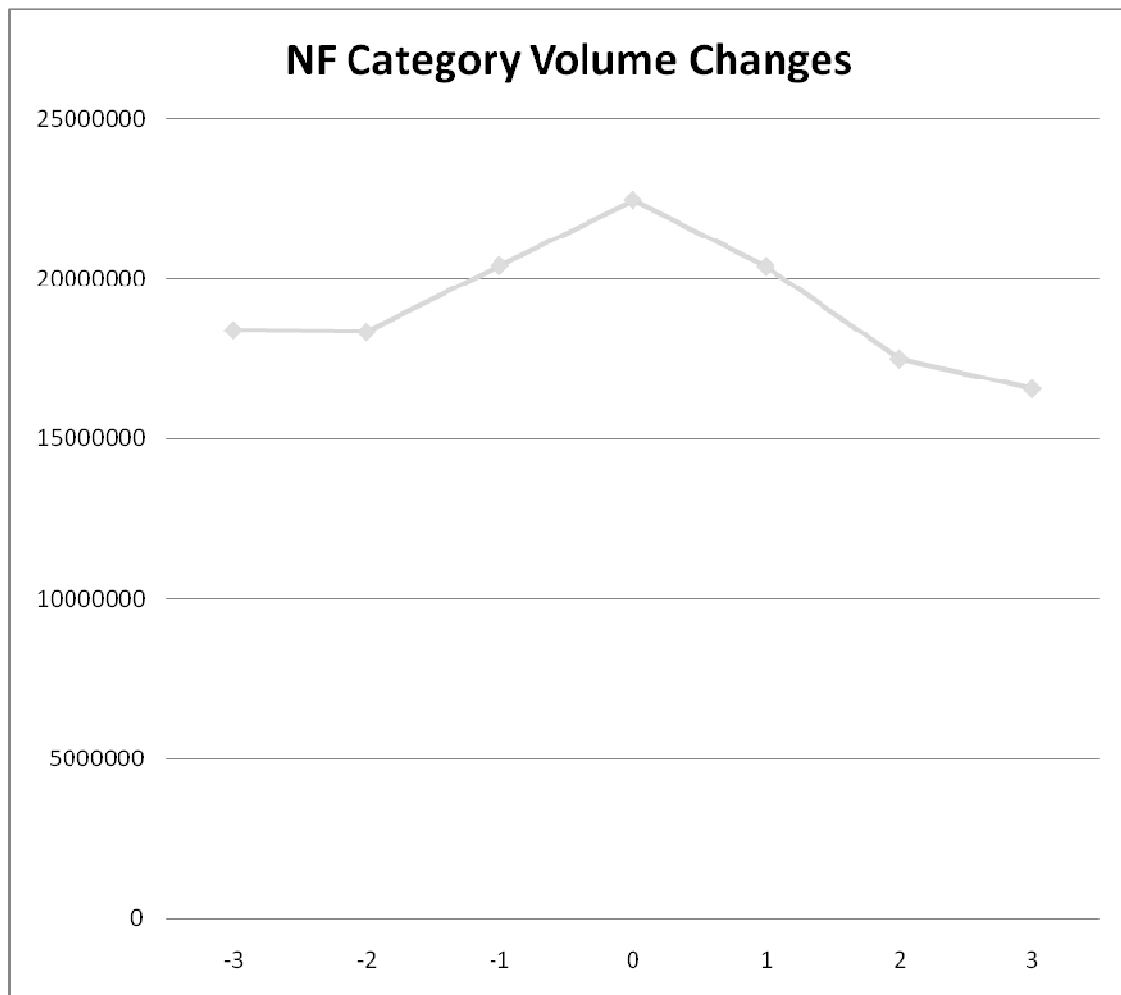


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Appendix C

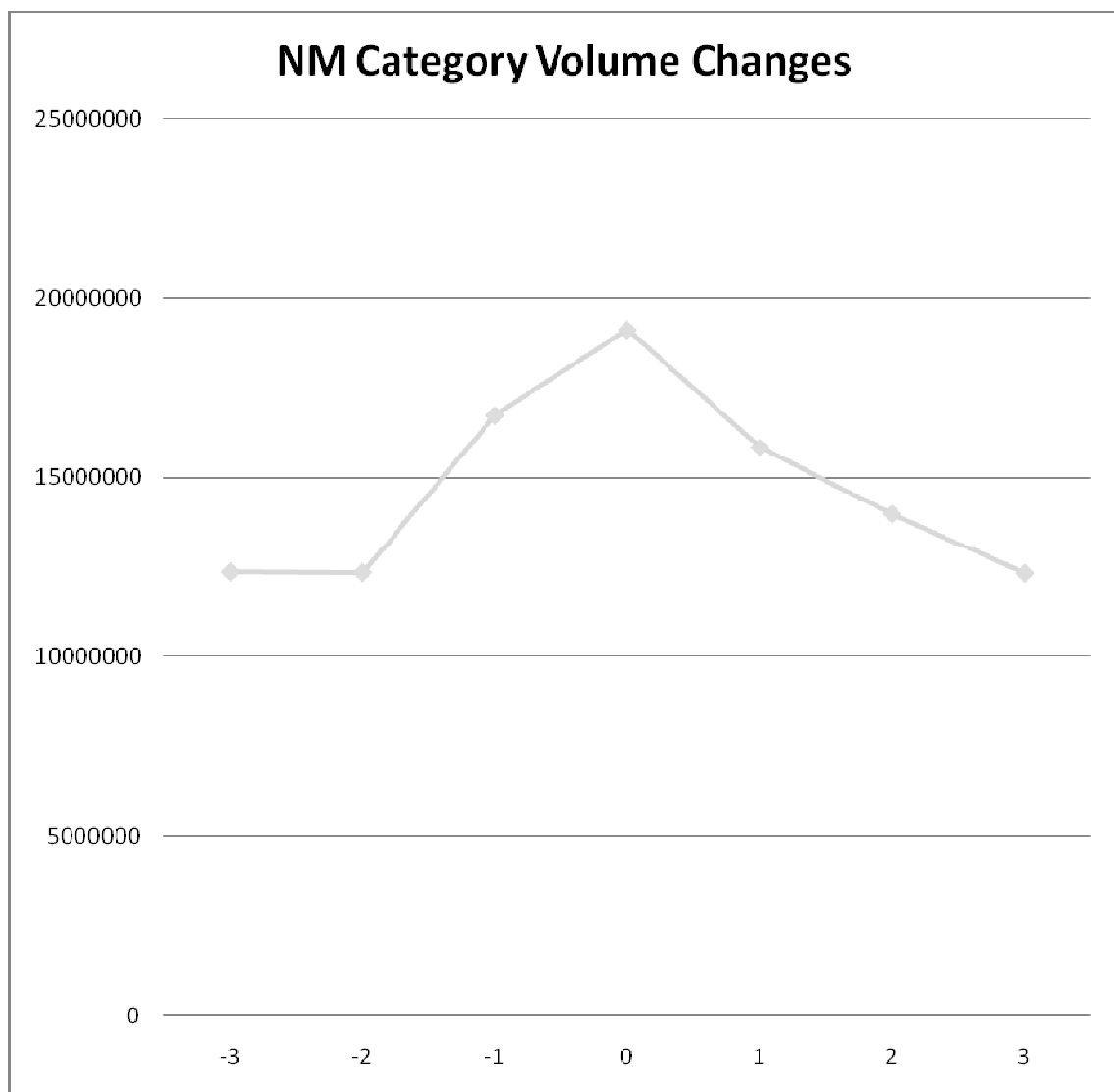
Volume Tables by News Categories

Volume Changes for News Category NF



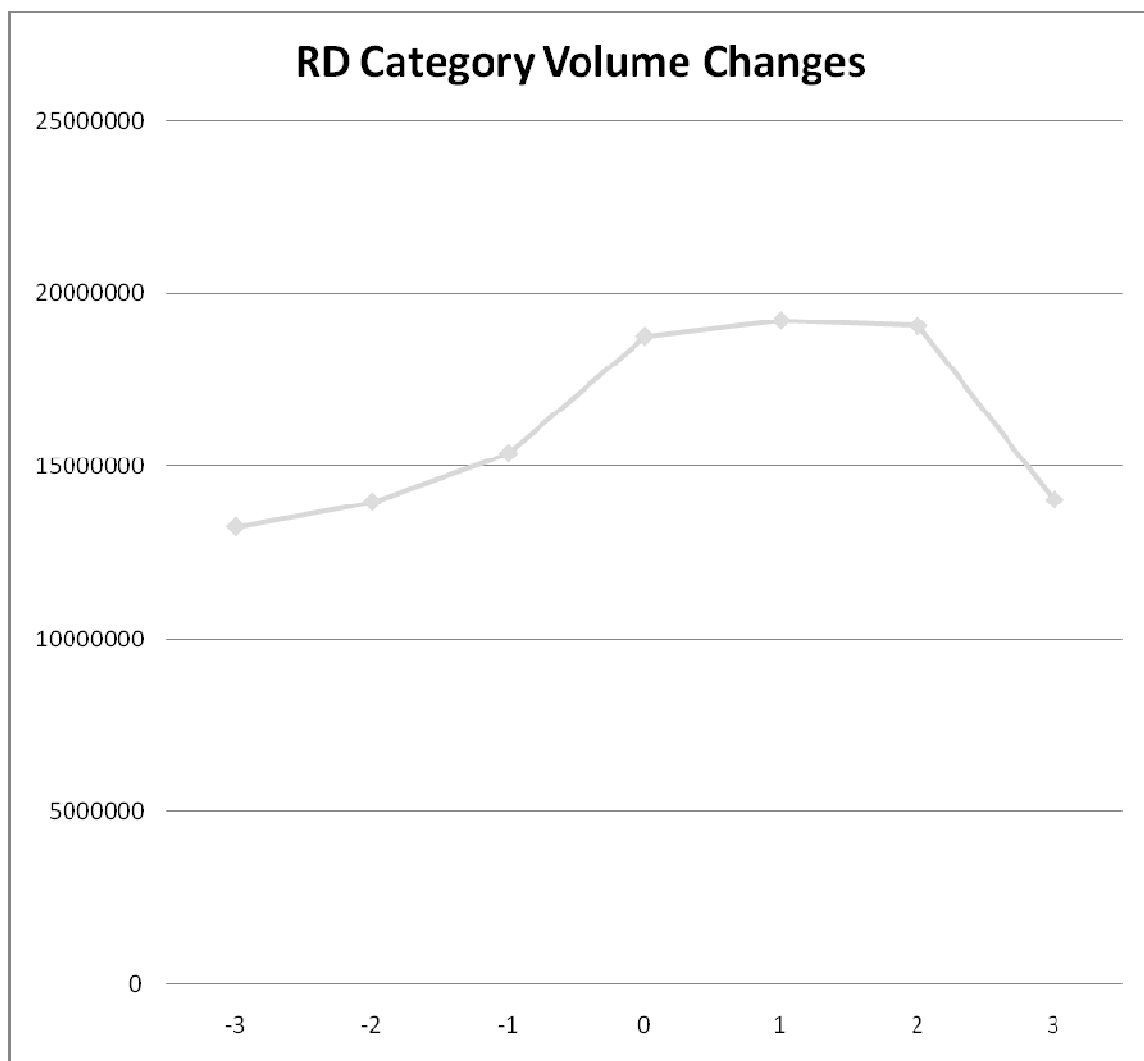
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Volume Changes for News Category NM



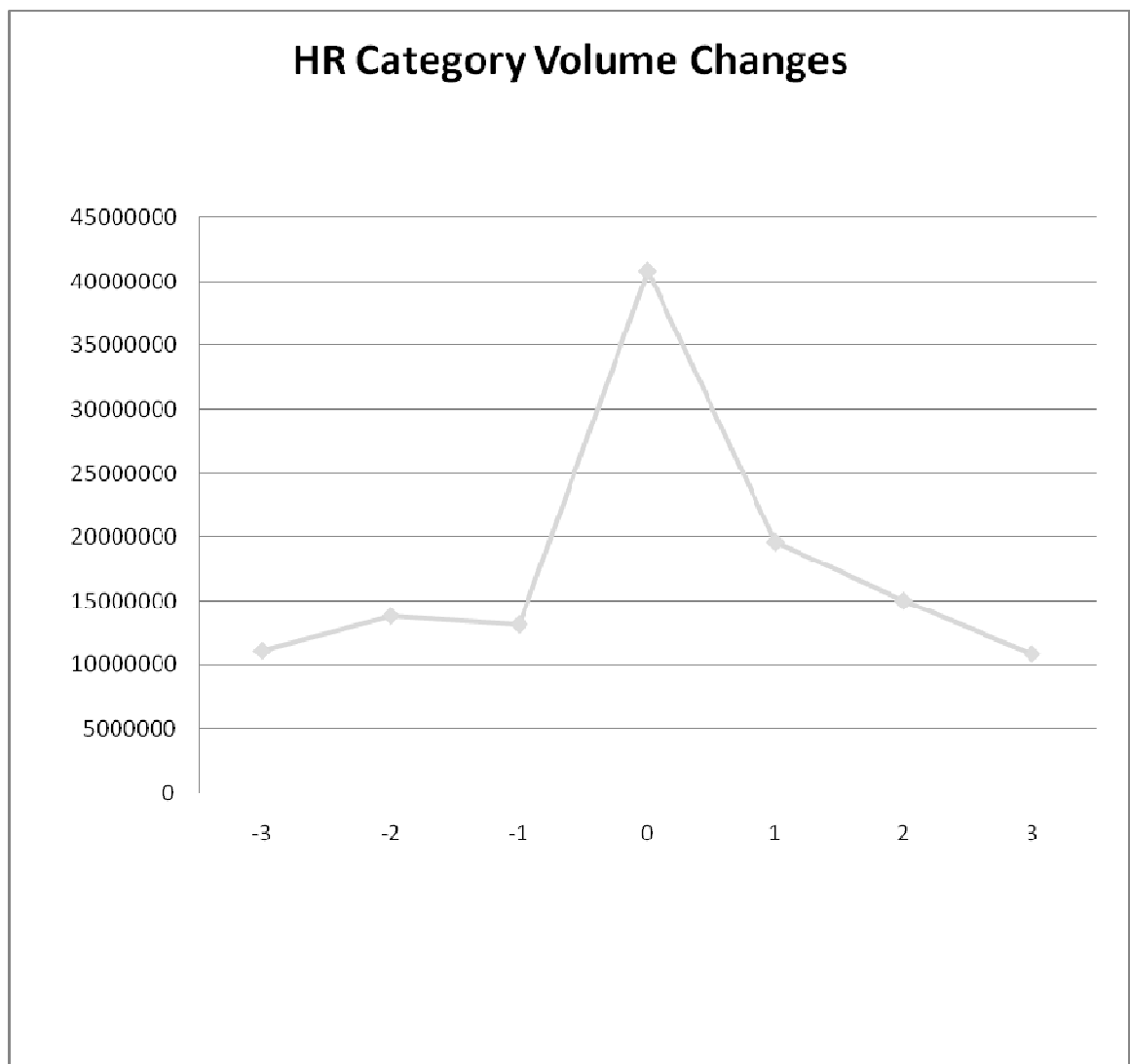
(Volume vertical axis, event date horizontal axis)

Volume Changes for News Category RD



(Volume vertical axis, event date horizontal axis)

Volume Changes for News Category HR



(Volume vertical axis, event date horizontal axis)